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Editorial Notes.

Fuel Problems—Mutual Service between the Coal and Gas Industries.

ALTHOUGH the consumption of raw coal for domestic purposes and in industry continues to absorb such a large proportion of the output, there is no doubt that there are forces at work, economic in character, which are slowly but surely having an effect in reducing the quantity of coal used relative to work done. Even where coal is still burned in the raw state, a ton goes farther to-day than it did in the past. The modern domestic coal fire and range are more efficient than they were once upon a time; the old 60 p.ct. efficiency of steam-boilers has been left far behind by modern firing, and round about 80 p.ct. and more is common in the newer plants; pulverized fuel (though possessing certain drawbacks) gives high efficiency; and coal-using industrial appliances are of a superior order in point of efficiency to their fast disappearing predecessors. There is also the economy in coal use which is promoted by the operations of the gas industry; and this is an expanding factor in the position. Oil fuel has stepped in; low-temperature carbonization is making a strong bid for a place in our fuel and oil systems; and there is the work that is being done on the hydrogenation of coal. All movements which produce greater efficiency and economy per ton of coal used must affect the scope for business of the coal industry, and must be taken into account when considering its future.

The Presidential Address of the Duke of Sutherland to the Society of British Gas Industries last Thursday treated of our fuel problems. It was an interesting, thoughtful, and suggestive contribution to a theme much discoursed upon, but not always with the intelligence that comes from inner knowledge. His Grace has the inner knowledge of the coal owner. Regarding our supplies of coal and oil, the address almost makes us feel that we are in an extraordinarily comfortable position, notwithstanding that the coal industry is passing through a period in which it is, from the economic standpoint, suffering heavily. There is the consolatory remark by His Grace that it has encountered worse periods, and has come through all right. We are quite prepared to believe that all will be well with it again; but it does not always do to have regard to precedent without considering circumstances, and the present circumstances of the coal industry are not those which existed when hard times were previously met with. There has, indeed, never been a time in history when a bigger change has come over the coal situation than during the past few years. Then, again, it is agreed that we have large stores of coal of excellent quality. But it has to be won; and we cannot always get it. We could not do so in 1926; and at normal times it is only got at a high cost. The President, in one of his tables, shows us how dear our production is per ton compared with that of other countries. We produce more coal than the Ruhr, Polish Upper Silesia, France, and Belgium; and yet our wages cost per ton of coal commercially disposable is higher than that of any other country, save Belgium. The consumers of British coal have to suffer in consequence; and their pockets are also affected by the fact that railway rates are higher here than in other countries. Those are conditions which events have shown are not easy to remove, although something should accrue in respect of the lightening of the costs of railway carriage through the rate relief that is coming under the scheme of the Chancellor of the Exchequer. But there is one thing that is necessary for the salvation of the industry. The Duke touches upon it when he says that he sees little hope for the coal industry so long as coal mining is allowed to remain the pawn on the chessboard of political opponents. But that appears likely to be a permanent condition with such a strong representation of the coal interests in the House of Commons—no fewer than 175 of the members being directly or indirectly interested in coal either from the employers' or the employees' standpoint. And another condition which gives it permanency is that the habit has grown of invoking the aid of the Government whenever a grievance exists in the industry. However, were it not for all these drawbacks, we should be in a very comfortable position in respect of coal.

In regard to the future of oil, our position is not regarded by the President as at all bad. At the beginning of the war, the United States had practically a monopoly of oil production. To-day great Britain controls, either directly or indirectly, through the capitalization of foreign companies, the major part of the world's future oil resources. From this His Grace deduces that, as the oil production of the United States declines, that of our Empire and associated foreign companies will grow, and in the near future we shall lead the world in the production of this valuable commodity. In view of this position, the question is asked in the address whether, under peaceful commercial and international conditions, there is any need for low-temperature carbonization or hydrogenation of coal? Before a safe answer can be given, it would be necessary to investigate whether or not there are any sufficient guarantees that there will continue to be peaceful commercial and international conditions. His Grace does not suggest there shall be any break in research upon the extraction of oil from coal; and we see no means, even if there was a desire to do so, of staying the hands of those who are pioneering the hydrogenation of coal, and of those who are working for a commercial place for low-temperature carbonization.

The main fields in which, as the President points out, oil competes with coal and gas are in industry, shipping, and road transport, and domestically among the poorer part of our population and in the rural areas. In industry the proportion of oil fuel used for power and heating is relatively small. He looks hopefully to shipowners replacing oil-fired boilers with pulverized coal boilers, though such a change could not be applied to the Navy, seeing that it would seriously affect the fighting capacity of our ships. In connection with heavy road transport and commercial vehicles, he thinks that it ought not to be beyond the wit of mechanical engineers to design their engines for the use of the cheapest fuel available in this

country—coal. In this connection he suggests that, if the Daily Press wishes to help industry, it could do no finer thing than offer a prize of (say) £5000 for the best-designed steam or gas-driven car using coal for its fuel, and running in competition with a petrol-driven car. This would set our mechanical engineers thinking in terms of coal instead of oil. The Daily Press may ask the Duke why it should take up a competition of the kind for the benefit of the coal industry. Why should not the coal-owners do it for themselves? There are, of course, practical difficulties—not the least being that no one wants road traction to contribute to the smoke nuisance. Gas coke would be far preferable; and it is already in good application for this purpose. So far as road traction goes, we do not see that it is likely to offer a great deal to the coal industry in the way of new business.

The President does not say much regarding the relations of the coal and gas industries; but he makes brief reference to "the mutual service which the gas and the mining industries should render each other in the national interest." We agree that the gas industry is so dependent upon cheap and suitable coal that a stable economic position of the mining industry is vital to its interests. All that the President says in this connection is true, but it does not go far enough, and so escapes the other side of the picture. Let us make two extracts from the address: "If every coalfield, or parts thereof, pooled its "coal output, and sold its coal to specification with the "object of giving complete satisfaction to all buyers, a "different outlook, and a brighter future, would result." Further: "The coalowners would, if they were called "upon to do so, supply coal, or even a blend of coals, "to a specification drawn-up by the gas industry. This "points to the necessity for coalowners to set-up market-"ing centres for the supply of coal for each of the large "coal-consuming industries. With this help the gas com-"panies could cheapen their products and extend their "spheres of activities." These quotations point to two things—the setting-up of coal-marketing schemes, and the willingness of the coalowners to supply the gas industry (if invited to do so) with coal, or blends of coal, to specification. We have not recently seen much evidence, through the already existing coal-marketing schemes, of any ardent desire on the part of the coal-owners to render "service" to the gas industry. They have with perfect frankness stated that all the extra money they require it is intended to draw from the public utility undertakings; and as to supplying coal to specification, it would have to be paid for in full. In the specification, ash would be dealt with, and lately we have been told that, in addition to paying for the cost of cleansing, the buyers of the coal would be expected to provide compensation for the loss of vend due to the cleansing—that is to say, something more must be paid for being supplied with genuine coal in place of incombustible and useless material. It is clear that there are more matters to be considered and discussed with the coalowners than the one of drawing-up a specification before there can be complete determination of the "mutual service" which the gas and the mining industries can render each other in the national interest. Perhaps if all coalowners were of the same way of thinking as the Duke of Sutherland, the path to mutual effort would be much smoother.

A Presidential Review.

In every business it is necessary for the responsible management to keep a keen eye not only on the internal affairs, but upon any and every proposal or external development which may in any way affect its interests. This applies with particular emphasis to gas undertakings, as is seen by making a rapid survey of the topics and conditions that to-day are engaging the attention of the administrative and professional men of the industry. The Presidential Address of Mr. J. B. Hansford, Engineer and Manager of the Bedford Gas Company, to the Eastern Counties Gas Managers' Association supplies an illustration of the demand for simultaneous concentration upon the business of the day, and the changes which may compel the forsaking of old policies or practices and the establishment of new. The address opens with some comments upon current conditions and prospective changes. There is present in the composition a cautious attitude, based upon personal consideration of the matters referred to, with the result that some of them the President finds acceptable, while over others there is an amount of doubt. We would rather see this in a chief executive officer than a mere follow-my-leader attitude, which has no contributory part in helping to shape correctly individual or collective policy.

It is admitted fairly generally to-day that the old traditional policy of the technical men of the industry to devote themselves almost exclusively to the work of producing gas, and to leave its utilization very much to take care of itself, was a mistake, the gravity of which has been facing us with stronger insistence as the new conditions upon which we have to do business have been growing around us. Had attention to utilization and public service been developed *pari passu* with gas production, then what we are called upon to do now to meet competition and to defend and advance our interests would not have appeared to some of us, as it now does, as something unorthodox and supererogatory. But we have to examine matters not only from the point of view of duty but from that of interests. And it is not (as Mr. Hansford indicates) in our interests to allow our competitors to do something that is attractive, and not do it ourselves on the ground that it does not harmonize very well with our ancient customs. He instances the case of gas companies working under the sliding-scale, which almost compels the making of every department self-supporting—for example, in respect of the hiring of apparatus, and its fixing and fitting beyond the conventional allowance of service-pipe free to the consumer. On the other hand, the President finds that his competitors look for little return upon the capital expended upon installation and very little upon that spent on apparatus. Their principal concern is output of current, and they judge progressive movement by reduced average price and by profit in the aggregate. That is a condition against which we have to compete. The one thing that can be said in our favour is that our heat units and our apparatus of equal capacity cost less, and the latter is less expensive to maintain. Nevertheless, the attractions of the policy of our competitors in respect of wiring, &c., are something with which we have to deal. "If we are to compete," says Mr. Hansford, "we surely should adopt a similar policy to that of our rivals." We must in all consideration of policy have regard to the ultimate maintenance and gain of business.

Our record shows that we are in agreement with the President in condemning as unbefitting these times the sliding-scale—standing alone, and bottomless in regard to dividend. He is of opinion that a fixed minimum dividend should be of general application. When the new legislation as planned by the National Gas Council is taken up by Parliament, perhaps we shall see the road opened to the gratification of this aspiration. On the subject of the adoption of the two-part tariff, the President is not persuaded as to the wisdom of this in all cases. He thinks individual companies should be allowed to work out their own system of charging; and he rather inclines to favour the alternative of a scale based on decreased price for increased consumption. But the two-part tariff, with its provision for the payment of a fixed sum to cover standing charges and a low secondary price per therm, gives to every consumer an inducement to consume more, and the more he consumes the lower automatically becomes the average price per therm. We would remind the President of his remark already quoted: "If we are to "compete, we surely should adopt a similar policy to that "of our rivals." He is not, of course, irreconcilably opposed to the two-part tariff; but we cannot ignore in this matter the experience with it of the electricity industry and of our gas friends in America. On the subject of amalgamation of small concerns with more economically situated larger ones, this is a policy that is approved by the President; but he would like the path eased by legislation. In that respect, he may have his desires fulfilled when the new Gas Bill is brought before Parliament. But the scheme which he has personally evolved for consideration by the industry is another matter, and we fear for its success. Without doubt, if a gas-works (however small) has to close down through electrical competition arising from the new availability of electricity through the Government scheme, the fact would be circulated with

great joy by our rivals. But that fact would hardly have sufficient force to persuade the gas industry that it should, to avoid anything so unpleasant, establish a National Fund, to which every undertaking should contribute a fixed sum per million c.ft. sold per annum. The fund would be controlled by a central administrative body; and then: "If a small works was unable to carry on "satisfactorily, the undertaking should be taken over by "the most suitable neighbouring works, and the cost of "the connecting main should be borne, wholly or partly, "by the fund, so as to make the amalgamation a paying "proposition, and, at the same time, enable the share-"holders of the absorbed company to be compensated at a "nominal rate." However excellent the idea may be, we are afraid that the benefit which would accrue to the industry as a whole is rather too vague to commend the scheme for such universal acceptance as to ensure the establishment of a National Fund for the purpose. Approval is given by the President to the movement for a Royal Charter for The Institution of Gas Engineers. The opening that is to be made for the inclusion in the membership of all men technically engaged in the provision of town gas, or the plant required for its production and distribution, is also welcomed; but he would rather have seen the borders of the technical area from which membership could be drawn extended to all engaged in the carbonization of coal. The Charter, he also opines, will improve the status of gas engineers generally; but he would be glad to see municipal administrators of gas undertakings take a broader view as to what constitutes adequate remuneration for men carrying the heavy responsibilities of gas engineers and managers. The correction of this lies largely with the profession itself. While there are men within its ranks who will accept positions at salaries much below what should be paid, so long will there be town councillors who will accept even the "lowest tender," despite the absence of adequate qualifications for the job.

In the second part of the address, the President reviewed the work that had been done in pulling the Bedford undertaking out of the conditions into which it had drifted during the years of war and immediately after. It had been selling gas cheaply before the war; but a spirit of contentment reigned, and there was no thought of the morrow. All that had to be changed, and the works had to be reorganized and largely reconstructed, with the incorporation of much new plant. But the scheme is now practically completed; and the Company are to be congratulated upon the state in which their works now stand. This also applies to the business generally; and in all the reformation ability and courage have taken no small part. The President has shouldered the responsibilities entrusted to him, and has justified the faith of his Board, by what he has succeeded in doing in times that were not the most favourable to accomplishment.

The Budget and Low-Temperature Carbonisation, Ltd.

DURING the past week, a little enlightenment has been given as to what was actually at the back of the mind of the Chancellor of the Exchequer in proposing to relieve the rates of productive industry and largely to finance himself for the purpose by imposing a tax of 4d. per gallon on imported petrol and light oils. The enlightenment is imparted in a letter that has been sent to the shareholders of Low-Temperature Carbonisation, Ltd., and signed by Sir Arthur Wheeler, Chairman, and Col. Whiston A. Bristow, Managing-Director. It informs the recipients that the Chancellor's proposals are "primarily of importance" in that they reflect the determination of the Government to foster the industry concerned in obtaining oil from British coal, which, in view of what follows, means "primarily" Low-Temperature Carbonisation, Ltd., though we do not suppose that the Company ever crossed the mind of the Chancellor. The Company's primary product is, of course, "Coalite;" or it is hoped that it will be, and that there will be a good market for it. But at the moment it is the Budget and its effect upon the fortunes of the Company's secondary product. We read in the letter to the shareholders: "The relief from duty of 4d. per gallon on "petrol is equivalent to a preference of nearly £5 per ton "on spirit derived from coal—thus greatly improving the "prospects of the British motor spirit industry, which "hitherto has had to compete with a cheaper imported "oil. In addition to increasing the intrinsic value of the "coal oils, the exemption from duty will cause them to be "in greater demand by reason of the fact that they will "comprise the only raw material from which duty-free "spirit will be obtainable." Following this there are two significant statements. The first is: "As your Company "is the *largest producer* of coal oil in this country by "the process of low-temperature carbonization, it follows "that it will derive *most* benefit from the new proposals; "and this is confirmed by the recent increase of activity in "the British oil market." The shareholders will observe that the words are used "by the process of low-temperature carbonization," which thus excludes the high-temperature ones, and their carbonization of 35 or 36 million tons of coal a year. And so "the first result of the new proposals will be to improve very considerably the prospects of the coal oil industry in which your Company is the chief pioneer in the country." This claim is rather startling, and to our mind misleading in view of the age of the carbonizing industries in this country, and the measure of the oil production of Low-Temperature Carbonisation, Ltd. At the recent Coal Carbonization Conference, Col. Bristow stated that the carbonizing capacity of the Company's plant is 200 tons per day, and the production of oil about 20 gallons per ton of coal. On a six-day working week, this would give 12,000 gallons of oil a week, and in 52 weeks 624,000 gallons—just about enough to make a splash in the enormous bulk of oil, measured by millions of gallons and not thousands, which is imported into this country in a twelvemonth. And the Company claim to be the "largest producers" of oil in this country by the low-temperature process! Such an output as that mentioned may at any moment be superseded by a large plant erected by a low-temperature competitor, because, as has been pointed out over and over again, the process of Low-Temperature Carbonisation, Ltd., is not the only pebble on the beach.

A Big Undertaking at Rio.

THE members of the gas profession, and especially those in the Midlands, will be pleased to have news of their colleague (Mr. C. H. Carder), who at the time he transferred his services from Oldbury to Rio de Janeiro, to be Chief Gas Engineer to the Tramway, Light, and Power Company of that city, was President of the Midland Association. It was in the spring of 1924 that Mr. Carder delivered his Presidential Address to the Association, and a week or two afterwards he was on his way to Rio. In view of Mr. Poulson's paper which was published on April 4, and upon which comment was made the next week, it is interesting to recall that, before Mr. Carder left Oldbury, he had inaugurated experimental work on the steaming of charges in continuous vertical retorts at different pressures and under different temperature conditions. From his new sphere of operations, he has sent us a copy of the first issue of "Light," which is the newly established "house organ" of the huge Company, with its several ramifications, with which he has been identified the past four years. In later columns an indication is given of some of its interesting contents, which show the diversity of the operations of the concern. They cover tramways, telephones, gas supply, omnibus service, electric light and power; and the employees aggregate upwards of 26,000. The new "house organ" has a special objective. Everything possible is done to inculcate the spirit of unity between the different sections of employees; to make them feel that they are all comrades in one big enterprise, and that whatever their place in the organization the interests of all sections are mutual and identical. The "house organ" is another bond; and it is believed that it will bring the different groups of workers into closer touch with each other, foster the team spirit throughout the organization, and promote a still greater interest in all the branches of the Company's business, and in the sports, welfare, and social work. The Company are desirous—it is the right desire—that all their employees shall possess the feeling that they are members of a homogeneous whole, and not merely em-

ployees in a section—for example, the interest of the gas worker is not confined to the gas undertaking, but should extend to all the operations of the Company; and the same applies to the tramway, telephone, omnibus, and electrical workers. To gain this among 26,000 employees, who, with their dependents, would constitute the population of a fair-sized town, is a fine ambition, and worth a great deal of effort. There is evidence that the administration of the Company realize their responsibilities not only to the shareholders, but to the army of employees whose lives are so largely bound up with the working of the vast enterprise. However, the article in a later column gives more information, which will be of especial interest to Mr. Carder's friends at home.

Basic Price and Dividend Inquiry.

In our "Parliamentary Intelligence" to-day, the proceedings are reported at the first two sittings of the Joint Committee of both Houses of Parliament who are inquiring into the basic price and dividend principle, as inaugurated by the South Metropolitan Gas Company, and since allowed by Parliament in the case of eight other gas companies. The question has been raised by the Board of Trade in two reports; and the present inquiry is the outcome, and the South Suburban and Dover Gas Bills this session (both of which propose to change to the basic price and basic dividend principle) supplied the opportunity for an investigation.

Rate Relief of Industry.

In the House of Commons on Monday of last week, Mr. H. G. Williams, Parliamentary Secretary to the Board of Trade, submitted approximate estimates of the direct relief from local rates that particular trades will receive under the Budget proposals. In regard to coal, the amount named is £2,500,000; Engineering (including Marine Engineering), £2,000,000 to £2,500,000; Cotton Spinning and Weaving, £1,500,000; Wool Combing, Spinning, and Weaving, £750,000; Chemical Industry, £600,000; Heavy Iron and Steel Industry, £550,000; Ship-building, £400,000; and Breweries and Distilleries, £400,000. Regarding other trades, Mr. Williams said the information available was not sufficient to justify an estimate. Why breweries and distilleries should be granted relief to the amount of £400,000, it is difficult to appreciate. We have not noticed any indications of their being hard up; and in present circumstances we see no opening for the relief passing to the consumers.

Housing Since the Armistice.

When the House went into Committee of Supply on Tuesday of last week on a vote for salaries and expenses of the Ministry of Health, Mr. Neville Chamberlain gave a large amount of interesting information on the subject of housing. The vote itself showed an increase of nearly one million over the estimate presented last year. Out of a total of £21,700,000, practically half, £10,700,000, was in connection with housing. That figure in itself showed an increase over the corresponding sum of last year by upwards of £1,000,000. So long as it is necessary to go on paying subsidies, so long shall we be adding to our commitments. Another interesting figure is that since the Armistice to March 31 last there have been built 1,102,000 houses, of which it may be taken that 412,000 have been built by local authorities, and the other 690,000 by private enterprise.

Notts Miners' Ballot.

In view of the result of the recent curious ballot of miners in Nottinghamshire, the General Council of the "T.U.C." are making another appeal to the coal owners for an interview. Now that the ballot has been taken, and is not entirely representative of the feeling in a coal-field (which employs many thousands more men than those that were balloted), the General Council of the "T.U.C." seem to be uncertain as to what course they can take, in view of their paper success. Another thing which they overlook is the fact that the coal owners did not ask them to take the ballot—in fact, they would have nothing to do with it, nor would the new Industrial Union, the membership of which since the ballot has increased instead of diminished. The ballot was a "T.U.C." invention, carried out on their own responsibility, and now they are welcome to all the value that there is in figures obtained in circumstances previously described.

Coal-Marketing Scheme Employment.

The curtailment of employment in the large area in which the Five-Counties Coal-Marketing Scheme is in operation continues; and the President of the Miners' Federation, Mr. Herbert Smith, has asserted again and again that the scheme has proved very detrimental to the interests of miners owing to the enforced reduction of production. Only last week it was stated that 1500 miners had received notice to terminate their employment at the Hovland Silkstone Colliery, near Barnsley, and 500 more have had notice to cease at the Barnsley Main Colliery.

British Coal Competition in Germany.

Several articles have been published recently in this country which indicate that the state of the German coal industry, especially in the Ruhr, is causing anxious discussion. What is described as the "grievous malady" affecting the industry is the huge expenditure incurred in meeting British competition in what is called the disputed area—that is, those parts of Germany in which British coal is selling below German production costs. This competition is described as of the "cut-throat order." To meet it, the Ruhr Coal-Selling Syndicate exacts from its component companies a monthly payment of 12 to 13 million marks, or round about 1·50 marks per ton produced, to meet the cost of the Syndicate organization, but the greater part of which is devoted to subsidizing the competition against British coal in the disputed area, in which some 2 million tons are sold. There is, too, what is known as the potential disputed area, in which another 1·4 million tons of coal are sold, and in which there are signs of competition developing. That is one picture; another, as supplied from a source in Germany, is that the position of the coal industry in that country is not nearly so bad as the owners prefer at the present time it should be painted.

Coal Output.

The output of coal during April fluctuated somewhat considerably; one cause being the Easter holidays. In the week ended April 7, the amount of coal raised was 4,345,500 tons; the number of men employed being 944,300. In the week ended April 14, which included the Easter holidays, the amount of coal raised was 3,241,100 tons; the workers numbering 936,300. The week ended April 21 showed the best re ult of the month, with 5,111,200 tons as the output, and workers 934,000. In the week ended April 28, the production was 4,980,800 tons, with 935,600 workers.

Germany and Synthetic Nitrate.

News comes from New York that recently an offer has been made in that city of $4,000,000 (£819,000) twenty-year 6 p.ct. mortgage bonds of the Ruhr Chemicals Corporation (Ruhrchemie A.G.)—a Company recently formed by 28 of the leading Ruhr colliery and steel interests to utilize waste coke-oven gases of the Ruhr for the manufacture of synthetic nitrate fertilizers. It is mentioned that the new Company, which includes the Vereinigte Stahlwerke A.G., the Thyssen, Stinnes, Krupp, and other important Ruhr concerns, controlling between them 70 p.ct. of the coke-oven gas production of the Ruhr, will use the Concordia-Linde-Casale processes. Plant capable of producing annually 300,000 tons of synthetic nitrate is already under construction; and the first unit at Holten near the Rhine will be ready early next year with an initial output of 16,100 tons.

PERSONAL.

We are pleased to announce that the President of The Institution of Gas Engineers is convalescent, and has returned to business.

ELECTRICITY SUPPLY MEMORANDA.

Fatalities and Damages.

We are glad that, in the claim for damages which was reported in our "Legal Intelligence" last week as having been heard by Mr. Justice Charles and a Special Jury at the Manchester Assizes on the 11th inst., the Manchester Corporation admitted liability; the only question for decision being the amount. But in the circumstances of this pitiful case, the Corporation might, we think, have regarded the claim on the generous side, instead of taking it to Court for determination. In October last, three girls (the daughters of working-class people) and an elderly woman were suffocated in bed owing to a short-circuit, the heat from which, Counsel said, caused a gas main to fracture. It is not quite clear whether the poisonous fumes which found their way into the house through a cavity in the wall were from the bitumen covering of the cable or from the fractured gas main—sufficient for the case is the fact that a short circuit was the means that enabled toxic fumes to find their way into the house, and to bring about the death of three promising girls and of an elderly woman. No claim was made for damages other than in respect of the three girls, two of whom the evidence showed were gifted in ways which gave fair prospect to the expectation that they would before long be in a position to help their parents financially; there was an element of speculation about the money-earning power of the youngest girl in time to be of much benefit to the parents. In the circumstances, it was regrettable that these matters had to be discussed. However, in the result the jury returned a verdict for £350 damages in respect of the children; and judgment was entered for the amount. Counsel for the Corporation asked if his Lordship would grant a stay of execution. To this the reply was given: "No, certainly not. I think the verdict is a very proper one; and it is not a penny too much." The inquiry indicates that, although the Corporation admitted liability, they apparently possessed somewhat niggardly notions as to what the damages should be. With the reply of his Lordship, most people who read the report of the case will be in complete accord.

City Electrical Fires.

In the report for 1927 of Dr. Waldo, Senior Coroner for London, of the 171 fires with which he dealt under the unique provisions of the City of London Fire Inquests Act, 1888, 28 had electrical origin. Of this number, fire and explosion in fourteen cases occurred in electrical distribution boxes located in City footways. The boxes in question belonged to the City of London Electric Lighting Company, the Charing Cross Electric Supply Company, and to the General Post Office. The cause of these alarming fires and explosions, as officially reported to Dr. Waldo, was simply "Defective electrical circuit." In no case was there any evidence of the presence of coal gas in connection with the explosions; and the suggestion is that the fumes given off by the bituminous covering of the cables caused the explosions. In his annual report for 1925, in referring to fifteen similar cases of electrical fires and explosions, Dr. Waldo said: "So far, these fires, producing extensive and dangerous upheaval of the footways, happily have not resulted in any deaths in the City, but several narrow escapes from death have occurred. I would suggest that a careful investigation of the root cause of these dangerous fires and explosions be made by the responsible Authority (the Ministry of Transport) with a view, if possible, to their prevention." Dr. Waldo has also suggested on more than one occasion that new up-to-date Regulations might usefully replace the old Board of Trade Regulations with a view to securing the safety of the public. In reply to a recent letter (January, 1928), addressed to the Minister of Transport, he received a communication from the Electricity Commissioners to the effect that the suggested Regulations are still under consideration. In addition to the fourteen electric distribution box fires referred to by Dr. Waldo, fourteen electrical fires in City buildings, due to defective circuits, came under his investigation in 1927. The preventive treatment of these has already been dealt with by him in former fire and annual reports. He believes that the compulsory adoption in the City of London of the excellent wiring rules of the Institution of Electrical Engineers would prove a cheap insurance against loss of life and property.

What's Wrong with Electric Cookers?

Mr. Cyril Sylvester, Assoc.M.Inst.E.E., recently published an article in the "Electrician" bearing this heading. He tries to give the modern cooker all its due. He admits that it is a more handsome piece of electrical equipment than the designs of twenty years ago. There is agreement that the control arrangements on the modern cooker or hotplate leave nothing to be desired; the apparatus is quite a small power and lighting station on its own. A double-pole switch controls the supply, a pilot lamp lights when the current is on, and each circuit is protected with its respective fuse. The modern cooker is lighter and much smaller. But Mr. Sylvester does not think much of the accomplishments regarding that most vital of considerations—energy consumption to heat output. He asserts that the old-time cooker was in this respect as efficient as the modern product. On the hotplate he could boil a 3-pint kettle in approximately fifteen minutes. He makes a calculation which shows that to raise 3 pints of water from 62° to 212° would require an input of 0·45 KW.-H., while the heat output is only 0·17 KW.H.—thus showing an efficiency for the hotplate of 38 p.ct. As he confesses, this is not very high, considering the years electric cooking has been in evidence. The road to improvement that he advises is to eliminate the heat losses, and operate the elements at a higher temperature.

A Geyser Companion.

The vital shortcoming criticized by Mr. Sylvester has caused Mr. C. Geo. Nobbs to write to our contemporary and make a suggestion for increasing the electrical equipment for the electricity consumer, and therefore the initial cost. As a preface to this, Mr. Nobbs says the tendency now is to revert to the enclosed type of hotplate, presumably for safety and to reduce maintenance costs. Several are available of the "quick" boiling type with comparatively high loadings and high temperature. But it appears that the limit has been reached in regard to loading per square inch to give reasonable life, and yet the efficiency is very low for the first boil. Thus it is clear that performance does not even now equal requirement, otherwise there would be no need for Mr. Nobbs to suggest that every electric cooker, owing to its deficiency, should have a geyser for a companion. What he says is: "No boiling plate can ever reach the geyser's efficiency of 95 p.ct., the loading may be 4, 5, 6, or even 8 KW. for kitchen sink purposes. A geyser is self adjustable for any desired temperature from cold to 'boiling' by simply turning the water on 'fast' or 'slow.' What a boon in the kitchen; hot to 'boiling' water in 2 or 3 minutes without limit! Some supply undertakings recognize the help an instantaneous geyser can be to the electric cooker. To ensure complete satisfaction, a geyser should be installed with every electric cooker." This is giving away the electric cooker with a vengeance.

Hot Water at a Fixed Price.

The schemes of the electricity undertakings for developing a load from the heating of water are as numerous and diverse as are tariffs for electricity supply. The Croydon Corporation Electricity Department has devised a system of a fixed price per annum for hot water service. The plan involves supplying the consumer with equipment, consisting of an "Inventum" night tariff cistern, time-switch, and meter. The customer can have either a 22 or a 33 gallon cistern; the charge per quarter for the former being £2 8s. 6d., and for the latter £3 14s. 8d. Apparently Croydon is very economical in the quantity of water it allows for a bath for an adult. We read that the small cistern—the 22 gallon size—is large enough for two hot baths consecutively, and still leave water for ordinary domestic purposes. It seems that the heating of the water is only done during the night, which, of course, is one of the restrictive drawbacks of all these systems. By the use of the time-switch control, if the cistern is emptied daily, the maximum consumption of electricity is fixed, and the load is confined to the night or off-peak period, while during the day cold water and the electricity supply are cut-off from the cistern. The Department evidently intend to be scrupulously careful that consumers are not robbed in any way. Arrangements are being made so that, if the consumption of electrical energy equal to the fixed cost is not shown on the meter at the end of the quarter, a rebate, for current not used, at the rate of ½d. per unit is to be made to the consumer. And so we are told that the consumer who is careful with hot water and not wasteful will reap the reward at the end of the quarter in the form of a rebate or bonus. This is looked upon as a distinct merit. The demerits are the limitations in service which the scheme proposes. If the consumer with the larger of the two cisterns uses the whole of the 33 gallons day by day, he would obtain in the quarter about 3000 gallons of water; the cost of this being £3 14s. 8d., including the equipment. The average cost per gallon therefore works out to 0·3d. Manifestly the Department are not going to get fat from this new business.

Prices and Capital Charges.

The big guns of the electricity industry have been, at recent meetings of supply companies, attacking those newspapers and grumblers who think that the price charged per unit for electricity is greater than it should be. Among the critics of the newspapers and the public is Sir Harry Renwick, Bart., K.B.E., who is Chairman or Director of various undertakings. One of these is the Richmond (Surrey) Electric Light and Power Company. At the meeting of the shareholders, he had much to say regarding the influences which affect the price of current. He looks upon the electricity supply business as probably the most intricate to conduct of all businesses. It is highly technical and, indeed, scientific. There

is an outstanding economic feature of the industry in that there is an unduly high ratio of fixed charges to working charges which is accounted for by the high cost and short life of the plant employed. This is intensified by the impracticability of storing electricity in large quantities. In the industry the aggregate invested capital is about six times greater than the annual receipts; and about 50 p.ct. of the receipts is absorbed in capital charges alone. That is a serious burden. In the view of Sir Harry, the so-called campaign for cheaper electricity can only have the effect of hindering the growth of demand, and thereby tending to stop the reduction of charges.

Refuse Destruction and Electricity Supply.

Malvern is in a little difficulty, and it has been created by the national electricity scheme. Like some other towns, Malvern has a refuse destructor, which is run in conjunction with its electricity generating station. In view of this, what is to be done now that Malvern is likely to be under an obligation to take its supply in bulk through the Worcester Corporation or the Shropshire, Worcestershire, and Staffordshire Power Company? When this happens, the destructor, of course, can continue its activities in the matter of refuse disposal; but the combination with it of electricity generating plant raises a difficulty. The Council are therefore asking the Central Electricity Board to allow the wedded plants to go on functioning, in view of the cost of generation being extremely modest. It seems to us that it will not matter very much whether or not the Central Electricity Board consent to the request, in view of the fact that such a combination must be very restricted in electricity output.

Water Power in Scotland.

Progress is being made with the Grampian undertaking, which will constitute the largest hydro-electric source for the provision of a public supply of electricity in the whole of the United Kingdom. The scheme in its rôle as a supplier of electricity for private and industrial purposes, and as a contributor of current to the Central Electricity Board, will play an important part in the larger policy of electricity availability in the country. It is stated that a contract has been entered into by the Company for the supply to the Central Board of approximately 52 million units per annum; and the supply will begin some time in 1930. The Grampian Company forms part of a large combination of properties owned by the Scottish Power Company, Ltd.; and it has an authorized capital of £1,750,000, which, subject to the Company's Act of 1928, may be increased to £4,000,000. Borrowing powers may also in certain circumstances be utilized to the amount of £4,000,000. The area within which the Company are authorized to supply is about 4214 square miles. Supplies of electricity to the national grid, it is stated, will be transmitted by high-tension overhead lines to be erected from the generating station at Loch Rannoch to a point near Perth.

Mishaps.

An electric crane situated on a 40 ft. high superstructure over Wearmouth Bridge, Sunderland, where reconstruction work was in progress, caught fire on the 10th inst., owing to the fusing of an electric wire. Earlier in the month, a workman, named Collison, employed by the Northern Electric Supply Company, Ltd., at their Haverton Hill Power Station, died in tragic circumstances. He was attending to an overhead wire conveying high-tension current from the Company's station to Haverton, when he was seen to collapse, and remain in an unconscious condition at the top of the pole to which he was secured by a sling round the body. On Collison being brought to the ground, it was found that life was extinct. Thomas Roger Hicks, of Northwich, age 19, has lost his life through climbing an electric standard in a field. A nurse, who was watching him from the Davenham Isolation Hospital, suddenly saw him burst into a mass of flame. With the matron she ran to his aid; and it was found that he had fallen to the ground, about 28 ft. He was removed to the infirmary, where he died. It is reported from Kabul that a cinema, the property of King Amanullah, has been burnt down. The fire, it is believed, was due to the fusing of electric wires, and two of the films of King Amanullah's tour in India were destroyed. Several lengths of high voltage cable belonging to the Bristol Electricity Department suffered damage on the 14th inst., through a fusion in a trench which had been opened for the reception of a new cable.

BRITISH COMMERCIAL GAS ASSOCIATION.

Meeting of the General Committee.

A Meeting of the General Committee of the British Commercial Gas Association was held at No. 28, Grosvenor Gardens, S.W. 1, on May 16, and in the absence of the President (Mr. Alfred Proctor) Mr. JOHN E. COWEN, J.P. (Past-President), presided.

Among apologies for absence received was one from Mr. W. N. Westlake, the elected representative of the Executive for the South-Western District; and it was unanimously resolved to convey to him the Committee's congratulations on his recovery from his recent illness.

RETIREMENT OF ALDERMAN G. E. HILTON.

A letter was read from Alderman Hilton, J.P. (Leicester), resigning office as a Vice-President of the Association; and it was unanimously resolved to place on record the Committee's sincere appreciation of the practical interest which Alderman Hilton had displayed in the work of the Association during his period of office.

NEW VICE-PRESIDENTS.

It was resolved to invite Alderman E. J. Holland, J.P. (Chairman of the Surrey County Council and Chairman of the Sutton (Surrey) Gas Company), and Councillor H. Carver, J.P. (Chairman of the City of Leicester Gas Committee), to accept office as Vice-Presidents of the Association.

RECOMMENDATION FOR ADDITIONAL MEMBERS OF THE GENERAL COMMITTEE.

The election of the following members of the General Committee to fill vacancies in the Southern District was unanimously approved.

Mr. H. Gage, Sutton.
" E. L. Nicholas, Guildford.
" C. Hulme, Uxbridge.
" L. G. Humphrys, Bexhill.
" D. T. Livesey, East Grinstead.
" T. H. Beaumont, Horley.
" J. Donaldson, Tonbridge.

ANNUAL CONFERENCE.

The date of the Association's Seventeenth Annual Conference was fixed from Monday to Wednesday, Oct. 22 to 24 inclusive, in York. An outline of the programme for the conference was given by the Chairman of the Executive, who announced that details would shortly be circulated to all members.

MEETING DAY OF THE GENERAL COMMITTEE

A summary of the replies to the questionnaire issued in connection with the holding of meetings of the General Committee showed a large majority in favour of (1) adhering to the present date—namely, the third Wednesday in the months of February, May, September, and November; and (2) that one meeting each year be held in a place outside London.

"GAS FLUE CONSTRUCTION" BOOKLET.

Specimens of this booklet, which has been prepared by the Gas Light and Coke Company and reprinted by the Association, by courtesy of the Company, were circulated at the meeting. It was reported that copies of the book would shortly be available for the use of all members, and a recommendation that undertakings should purchase copies for circulation to local architects and builders was approved.

BRITISH INDUSTRIES FAIR, 1929.

It was reported that the Association were co-operating with other organizations in regard to the Gas Industries Section of the British Industries Fair, Birmingham, 1929.

HEADQUARTERS' REPORT.

The following Headquarters' Report to the Executive Committee was considered and approved.

DISTRICT CONFERENCES.

Since our previous report, District Conferences have been held in Ilfracombe (South-West) and in Redditch (Midlands). Both conferences proved of value and interest. Matters of importance, from the point of view of the whole industry, were considered and discussed, and, as usual, excellent newspaper publicity, the result of systematic distribution of good news material, resulted.

A conference for the Cornish District is being held on Thursday, May 24, for which a particularly attractive programme has been arranged.

DISTRICT MEETINGS

With the exception of Wales, for which a convenient date is being arranged, meetings of the District representatives of the General Committee have now been held in all districts. A special meeting of representatives of subscribers in Cumberland was attended recently by the Manager for the discussion of Association policy. Questions

raised on various points were answered, and general satisfaction was expressed. While in the Districts at these meetings, opportunities are taken of personally calling on members and non-subscribers.

The Manager, by request, delivered the annual address to the Scottish Junior Gas Association, in Glasgow, taking for his subject "Manufacture and Salesmanship—An Essential Partnership."

INCREASED SUBSCRIPTIONS.

Increases in existing and new subscriptions since Jan. 1 last were reported, representing an annual addition to the Association's income of nearly £600. The total increase in the Association's income from joint subscriptions for the financial year ended March 31 was just over £8000.

SALES OF PUBLICITY MATERIAL.

The sale of publicity material during the year ended March 31 last has shown healthy signs of development. In so far as publicity material (as represented by literature of all kinds) is concerned, the sales for the year reached the record figure of £11,569—the highest in the history of the Association. The sales represent just over four million pieces of literature, *plus* two million illustrated envelopes, making a total of over six million items.

The studio which was started about five years ago in response to a demand from members for assistance in the preparation of material, particularly for showroom use, also shows a steady development.

During the five years ended March 31 last the number of orders handled and the number of members to whom service has been rendered have both doubled, and we have every evidence that the service which is provided by the Association in this connection is of practical value to, and much appreciated by, the smaller undertakings in particular.

The provision of showroom window displays and dressings, cut-outs, showcards, posters, price tickets, and the various other items which have been supplied by the Association have undoubtedly assisted members in raising the standard of display in showrooms and increasing their general attractiveness.

COMMERCIAL ORGANIZATION AND DEVELOPMENT SECTION.

The services of this section continue to be in demand by a number of members, and during the year personal service covering all phases of organization and development has been given to just on one hundred undertakings. The design, planning, and equipment of showrooms are matters on which the services of this section have been in demand, and important schemes embracing material alterations to premises have been entrusted to the Association. Considerable service has also been given in the arrangement, lay-out, and suggestions for district and local exhibitions.

NATIONAL AND DISTRICT PUBLICITY SCHEME, 1928-29.

The detailed scheme of national and district publicity for the current financial year is now completed, and it is hoped to circulate a schedule, giving a list of the selected and approved media and the approximate dates on which advertisements will appear, to members in the near future. The district media have been selected in consultation with, and approved by, the District Committees at the various meetings which have been held recently.

We have pleasure in reporting that, judged from the results of advertisements which appeared during the months of March and April, the "Mr. G. A. Service" copy is arousing considerable interest. The advertisements are bringing daily an increasing number of a good type of inquiry—that is to say, from the consumer who has practical interest in the extended use of gas or the solution of an existing difficulty, as distinct from the "please send catalogue" type of inquirer. In addition, the advertisements have made an instant appeal to a considerable number of our members who are using the "copy" for their own advertising in local newspapers. The Editor has prepared suggestions for the general use of the advertisements for local publicity, particulars of which have already been circulated to members in response to applications. Particulars will appear in an early issue of the "Bulletin."

CHILDREN'S FAIRY GAS COMPETITION.

The 1928 Children's Fairy Gas Competition is now in circulation, and the practical interest which is being shown by members who are pushing the competition locally, and the number of inquiries that are being received from school teachers from all parts of the country, indicate that the competition will, as hitherto, achieve considerable success. Already there are indications that the number of entrants will exceed all previous competitions.

IDEAL HOME EXHIBITION, OLYMPIA, 1928.

The following letter has been received from the Department of Overseas Trade:

> I am desired to express to you the thanks of the Empire Marketing Board, and of this Department, for the services rendered by your Association in connection with the demonstration kitchens at the above exhibition.
>
> It is true to say that the kitchens were again a successful feature of the exhibition; and the efficiency of the cooking installation and of the demonstrating staff provided contributed largely to this result.
>
> (Signed) L. A. DE L. MEREDITH,
> for the Comptroller-General.

GAS LIGHTING IN RELATION TO NATIONAL CO-OPERATIVE PUBLICITY.

The Executive Chairman opened a discussion on this question with a statement as to the considered policy of the Executive Committee. Several members took part in the discussion, and it was unanimously resolved that, if possible, an opportunity should be provided in the conference programme at York for further discussion at the private session.

The meeting concluded with a vote of thanks to Mr. Cowen for occupying the chair.

GAS-MAKING IN RIO DE JANEIRO.

A Splendid Example of Service.

From Mr. C. H. Carder, the Chief Gas Engineer to the Rio de Janeiro Tramway, Light, and Power Company, Ltd., we have received a copy of the first number of "Light," the newly-established house organ of the Company, which, Mr. Carder informs us, is itself locally referred to as "the Light." It was in 1924, when Mr. Carder was President of the Midland Association of Gas Engineers and Managers, and was Engineer and Manager at Oldbury, that he left England to take up his duties at Rio de Janeiro. While at the Oldbury Gas-Works, he carried out an extensive reconstruction scheme, starting with coal handling and finishing with the purifiers, and also investigated the effect of steaming at different pressures under varying temperature conditions.

"Light," which is written in Portuguese, gives an excellent idea of the diversity of interests represented by the Company, and it will doubtless bring the different groups of employees more closely into touch with each other, and will foster the team spirit throughout the organization. Much has already been done in this direction by the Company's Benevolent Association, with its extensive medical service, and by its sports organization, some aspects of which are dealt with in the publication. The total number of employees of the Company, with its associated interests of tramways, telephones, gas supply, and omnibus service, as well as electric light and power service, exceeds 26,000; and it is only by means of some widely circulated publication such as "Light" that members of the various departments can be even remotely kept in touch with the work of their confrères in other sections, and can feel that they are parts of a homogeneous whole, rather than individual units whose conception of their corporate responsibility is bounded by their particular department.

Two of the articles in the first issue of "Light" are of particular interest. One is an impression of the Rio Gas-Works; and the other gives an account of the services of the Head of the Information and Complaints Section of the Company.

THE RIO GAS-WORKS.

What impresses the visitor most on entering the gas-works of the Société Anonyme du Gaz de Rio de Janeiro, it is stated, in its magnificent situation at the Caes do Porto, is the keenness of the administration, in evidence on all sides, to diminish the more arduous work of the operators. One is compelled to express admiration for the intelligent effort and expenditure devoted to ensuring the maximum comfort and well-being of the men. There is on the works one of the oldest workers in Rio; his age being 95 years. He has 22 years service on the works to his credit, and still feels strong and well, and does not desire any change.

At the works there is a model restaurant where cooked meals and refreshments are obtainable equal to any at home, and at reasonable prices. There is also a splendid installation of bath and dressing rooms, used by 400 men daily, the most rigorous laws of cleanliness being followed.

In regard to the mechanical plant, wherever possible heavy manual work has been replaced by machinery, and much of the necessary cleaning of this plant is done by compressed air hoses. All transport of materials is carried out by cars and elevators. The furnaces for heating the retorts have at their bases water-cooled firebars set in step form; this arrangement facilitating considerably the removal of the ash and clinker. Installations of new plant, and modernizing of the old, are being carried out every year, and much of the necessary design and construction is carried out by the Company's own technical staff. New purifiers, for example, have been constructed entirely by their own men working to designs and instructions of the Company's Engineers.

The coal is taken out direct from lighters (which come up the Mangue Canal from the sea) by means of a large grab hoist which is connected by a gantry to a movable bridge, 75 metres in length; this arrangement allowing the coal to be dumped in a series of piles which cover a large area of ground. The coal is raised from these piles by means of a "scraper bucket" having a capacity of 3 tons, and dumped into wagons which run on a raised gantry feeding the various retort houses. Each retort house has a chute connecting from the gantry to a breaker, where the coal is broken to a suitable size. After being broken, the coal is raised to a series of hoppers situated over the retort benches by means of bucket elevators connecting

to the breakers. The retorts are discharged every twelve hours by means of a suspended car which is brought into the required position—viz., directly below the bottom doors of the retorts to be discharged.

The "Gas Man" and His 52 Years' Service.

In the second article to which we have referred it is mentioned that Feb. 2 last was the anniversary of the birthday of Pedro Leite de Vasconcellos—as he was baptized in 1860, but which name is used by nobody—or (as he is known by nearly the whole of Rio, the "Homen do Gaz" (the Gas Man).

There are men who can be singled out by their devotion to their work; it is difficult to imagine them separated from it. Vasconcellos is one of these. For fifty-two years he has been connected with the Gas Company—the whole of his life. He is perhaps the best known man in Rio de Janeiro—because he is the "Homen do Gaz!" Not, it must be said, as a natural consequence of the public nature of his duties, but because of the manner in which he has carried them out. His popularity is due entirely to his disposition, which includes a geniality of spirit without equal, unlimited patience, and a wonderful amount of tolerance. He is a man of simple and good tastes with an extraordinarily sympathetic manner of speech and gesture. With a word, he will often change the most irritated customer to a good humoured friend.

Vasconcellos entered the Company's service in 1876, at the age of sixteen. The Company then was owned by the English, but subsequently, in September, 1886, passed to a Belgian concern, and later to its present form—the Société Anonyme du Gaz. His first position was in the coke sales department. He became chief of the meter readers, and then passed to the general office legal department. Subsequently he occupied the positions of chief collector and chief of the commercial department. His present position is Head of the Information and Complaints Section. It is unnecessary to emphasize the value of his long experience and knowledge thus gained. His constant endeavour to maintain a high standard of service is greatly appreciated both by the Company and by the consumers. "Ladies complain more, and necessitate the most attention," he says, "but we must remember this is only natural, since they are responsible for the smooth running of the home. If, however, their complaints, like all others, are attended to in the proper manner, all end satisfactorily."

During his fifty-two years' service, Vasconcellos has only been absent from his duties for half-a-day when he married, one day on the death of his wife, half-a-day when he married again, and eight days when he had an attack of cholera. It would be difficult to find a better example of devotion to work than this. We heartily congratulate Vasconcellos on his splendid record of service.

POTENTIAL INVESTMENTS.

XI.—CROYDON GAS COMPANY.

The Croydon Gas Company was incorporated as the Croydon Commercial Gas and Coke Company by Special Act of Parliament in the year 1847. Further powers were obtained between the years 1860 and 1926, the name being changed in 1904; and during this period the Company acquired the undertakings supplying the Carshalton and Caterham Districts. The statutory area of supply covers 70 square miles, which includes populous districts of Croydon (part), Beddington, Carshalton, Caterham, Coulsdon, Kenley, Norbury, Purley, Sanderstead, Wallington, and Woodside. The population of the district supplied is estimated at about 300,000; and there are 67,061 gas services.

The capital of the Company, as shown by the last accounts (Dec. 31, 1927), is as follows:

Capital Stock.

	£	£
Ordinary—		
Sliding-scale stock (3½ p.ct. standard)		787,560
Maximum dividend stock (5 p.ct.)		403,100
Redeemable preference stock (7½ p.ct.)		120,000
		1,310,660
Premium capital—ordinary stock		101,716
Remaining to be issued as sliding-scale, maximum dividend, redeemable or irredeemable preference stock		300,000
		£1,712,376

Loan Capital.

	£	£
5 p.ct. debenture stock	110,000	
4 " " "	100,000	
7 " redeemable stock, 1940	115,000	
6 " " " 1932	70,000	
		395,000
Premium capital		10,547
*Remaining to be issued		240,287
		£645,834

* In addition, the Company may raise by borrowing sums not exceeding one-half of the amount (including premiums) subsequently raised by the issue of ordinary capital.

Transfer arrangements: Common form. No fees. All classes of stock (in amounts and multiples of £1) can be transferred on the same deed. Husband's witness of wife's signature, and vice versa, accepted. Voting: 1 vote for every £5 capital stock of any class. Director's qualification, £500 of sliding-scale stock and/or maximum dividend stock.

Accounts and Dividends: Accounts made up to Dec. 31, and submitted in February; dividends (on all classes of capital stock) being paid on Sept. 1 and March 1. The standard price is 1s. 5⅛d. per therm; present price, 9⅝d. per therm; declared calorific value, 500 B.Th.U. per c.ft. The sliding-scale applicable to dividends on the sliding-scale stock is as follows: ⅛d. per therm above or below the standard price = ⅛ p.ct. p.a. on the year's dividend.

The following table illustrates the progress made by the Company since the year 1903. The period of the war and the few following years have been purposely ignored, in consequence of the abnormal conditions then prevailing.

The gas sold during the past year shows an increase as compared with the year 1903 of over 200 p.ct., and during the past few years there has been a steady progress of from 3 to 4 p.ct. per annum. The district supplied by the Company, being within easy access of London, is particularly attractive to private residents; and there is little doubt that there is a local demand for both the sliding-scale and the maximum dividend stocks. Owing to the rapid growth of business since the war, there has been no material reduction in the capital expenditure, which it will be observed stands at 2s. 1d. per therm.

Year.	Average Gross Selling Price of Gas in Company's Principal Area. Per 1000 C.Ft.	Quantity Sold. Thousands C.Ft.	Capital Expended per 1000 C.Ft. Sold.	Gross Profit.	Total Charge for Capital. (a.)	Rates of Sliding-Scale Dividend. P.Ct. per Annum.	Amount Carried Forward and Balance Reserve Fund.
	s. d.		s. d.	£	£	£ s. d.	£
1903	2 8	882,724	10 6	42,211	40,015	A 14 10 0 B 11 10 0	32,491
1908	2 9	1,208,666	11 5	54,823	50,281	A 14 10 0 B 11 10 0	39,166
1913	2 5	1,533,900	9 3	57,729	53,823	A 15 0 0 B 12 0 0	64,085
	Per Therm. d.	Therms.	Per Therm. s. d.				
1923	9·7	10,889,528	2 1	120,821	94,788	6 10 0	76,189
1924	8·85	11,834,494	1 11	74,917	90,485	6 10 0	63,088
1925	9·55	12,394,275	2 1	100,652	97,035	6 10 0	69,324
1926	10·02	12,801,827	2 2	88,288	103,375	6 10 0	59,280
1927	10 8	13,300,002	2 1	152,188	117,506	6 15 0	83,566

(a) The total charge for capital includes dividend and interest paid and amount (if any) carried to reserve fund.

Note.—The dividends marked "A" and "B" in the above table were on the old 10 p.ct. and 7 p.ct. stocks respectively, which were converted under the Special Order of the Board of Trade, 1922, as follows:

£100 "A" stock into £200 sliding-scale stock and £60 maximum dividend stock.
£100 "B" stock into £200 sliding-scale stock.

The following table shows the prices of the highest and lowest transactions on the 3½ p.ct. sliding-scale stock, the dividends paid, and the yield on the average price during the five years 1923-1927:

3½ *P.Ct. Sliding Scale Stock.*

Year.	Transactions.		Dividend.	Yield P.Ct. per Annum on Average Price.
	Highest.	Lowest.		
			£ s. d.	£ s. d.
1923	105	99	0 10 0	0 7 5
1924	105	100	6 10 0	6 6 9
1925	105	97	6 10 0	6 8 8
1926	99⅞	95¾	6 10 0	6 13 4
1927	101	96	6 15 0	6 17 0

The above transactions are from the London Stock Exchange records; but there is a large local demand for the stock, which is frequently sold at higher prices. At the present time the Stock Exchange quotation is 108-113, and the authorized dividend under the sliding-scale for the current half-year is £8 12s. 6d., so that there is a reasonable prospect of an improved dividend. The yield at the present average price, based on the last half-year's dividend paid (£7 p.ct. p.a.), is £6 6s. 8d. p.ct.

The maximum dividend stock is quoted at 84-87, yielding on the average quotation £5 17s. p.ct. p.a.

SOCIETY OF BRITISH GAS INDUSTRIES.

ANNUAL GENERAL MEETING.

Matters of outstanding importance were dealt with at the annual general meeting of the Society, which took place on Thursday afternoon, May 17, at the Hotel Cecil, Strand, W.C., under the Presidency of His Grace the DUKE OF SUTHERLAND, whose address dealt in a helpful manner with the vital problem of fuel. This was followed by the unanimous adoption, on the recommendation of the Council, of a report containing proposals having for their object the enhancement of the usefulness and prestige of the Society. At the annual dinner in the evening, there were many distinguished visitors; and the speeches made the occasion a memorable one. The new President of the Society is the Most Hon. the Marquess of Hartington, M.P.

On the opening of the business proceedings, the minutes of the last annual meeting and of the autumn meeting were taken as read, and confirmed.

REPORT OF THE COUNCIL FOR 1927-28.

Mr. R. B. HODGSON (Chairman of the Council) then submitted the following report upon the work of the Society during the year 1927-28.

We have to record with much regret the death of the following member:

Thomas A. Orme, of George Orme & Co., and a Director of Meters, Ltd.

The Society wishes to offer congratulations to the following gentlemen:

Sir Robert Hadfield, Bt., F.R.S., who has had the honorary degree of D.Sc. conferred upon him by Oxford University.

Sir Alfred Mond, Bt., M.P., who has had the honorary degree of LL.D. conferred upon him by St. Andrews University. Also the gold medal of the Institution of Mining and Metallurgy has been awarded to him "in recognition of his scientific and industrial services in the development of the mineral resources and metallurgical industries of the British Empire."

Relationship between Employers and Employed.—In the engineering trade it is pleasing to note a feeling of better relationship between employers and employed; and we are hopeful that it may be possible to settle down wholeheartedly for some time to work together on mutual and co-operative lines which will be beneficial to trade generally. In this connection, we heartily welcome the conference to explore the entire field of industrial re-organization and industrial relations now taking place between a representative group of employers and the General Council of the Trade Union Congress, under the Chairmanship of Sir Alfred Mond, one of our Past-Presidents. Sir Robert Hadfield, Lord Weir, and Sir David Milne-Watson, Past-Presidents, are members of the employers' group. We sincerely trust that the efforts of the conference may be crowned with success.

The Institution of Gas Engineers—Proposed Royal Charter.—The Council have given the Society's unanimous support to the Institution in connection with their application for a Royal Charter of Incorporation, and wish them a successful issue. This support has been all the more readily given because the Council realize that the Institution are taking the opportunity for broadening their basis of membership, and at the same time demanding a much higher technical qualification.

British Industries Fair, Birmingham, 1928.—The Gas Section at the Fair organized by the Society was pronounced to be a genuine success; and we desire to thank our members for their generous aid. We are much indebted to the Birmingham Corporation Gas Department for the energetic work they put into the organization and development of the Section, and to Mr. R. J. Rogers, who so ably acted as Hon. Secretary. The Council paid an official visit to the Fair on Feb. 22, and inspected the fine display of the Gas Section. The Council have decided that the Society shall organize a Gas Section for the British Industries Fair, 1929, and have formed an Exhibition Committee on which there will be two representatives of the National Gas Council, The Institution of Gas Engineers, the British Commercial Gas Association, and the Birmingham Corporation Gas Department, so that all interests in the gas industry will be represented.

Carbonization Conference.—A Carbonization Conference organized by the Joint Fuel Committee consisting of The Institution of Gas Engineers, the Coke Oven Managers' Association, the Society of Chemical Industry, and the Institute of Fuel was held in Birmingham in February, under the Presidency of Prof. Arthur Smithells, F.R.S., Chairman of the Joint Fuel Committee, when a number of important papers were presented and discussed. Several of our members were present at the conference, some of whom took part in the discussion. Congratulations are due to Dr. E. W. Smith, Hon. Secretary of the Joint Fuel Committee, for the excellent arrangements made for the conference.

Conference on Methods of Analysis of Coal.—We were represented at an important conference held in October, convened by the British Engineering Standards Association, in response to an official request from the Committee of the Privy Council on Scientific and Industrial Research, when the question of the adoption of Report No. 7 "Methods of Analysis of Coal" as drawn up by the Fuel Research Board was considered. As an outcome of the conference, the British Engineering Standards Association has set up a representative Committee to go into the question and make recommendations for the commercial analysis and sampling of coal.

Retort Setters.—Conferences between Section 1 of the Society and the Amalgamated Union of Building Trade Workers have been held during the year. A new agreement with certain modifications was made in May last; and this, with a further modification to meet the wishes of the Federation of Gas Employers, has now been extended to May 1, 1929. The relations during these conferences have been of a satisfactory and friendly character.

Standard for Flanges and Cast Pipes.—The British standard dimensions for cast-iron pipe flanges have now been issued by the British Engineering Standards Association, based upon the proposals recommended by the Joint Committee of The Institution of Gas Engineers and our Society.

Register of Names of Apparatus.—The registration of trade names has already proved to be of considerable service to a number of members of Section VI.; and it would be in the interest of all members of this Section to enter into the arrangements wholeheartedly, as nothing but benefit can accrue by so doing.

Proposed New Form of Building Contract.—A meeting was convened by the Builders' Merchants' Alliance in February to consider this; and, as certain clauses in it would be unacceptable to our members, particularly those in Section VI., the Society was represented at the meeting. As a result, a Committee was formed to watch the interests of merchants and manufacturers connected with the building trade who, in common with our members, found the proposed new form of contract unsatisfactory. This Committee will appoint, if necessary, a deputation to explain the objections in the event of the matter being carried any further.

Gas Fire Flues.—Reference to this, and the tendency observable in some parts of the country to construct houses without flues of any kind, was made in the half-yearly report. The Society are watching with interest the tests that are being carried out by Mr. A. H. Barker regarding the ventilation of living rooms. As mentioned before, one of our members is carrying out extensive propaganda against flueless rooms or inadequate flues for gas fires, by promoting the use of their special concrete gas flue blocks. Very considerable savings in buildings cost result from the use of these blocks instead of the ordinary brick chimney, which is an inducement to the builder, who is tempted to leave out flues entirely in some rooms on the score of economy; and as a result thousands of living rooms to-day are fitted with gas fires which would not have been otherwise. During the past year several important housing schemes have been equipped with these blocks, and also a number of large blocks of flats. Very interesting articles appeared on the subject in the "Heating and Ventilating Engineer" for December, 1927, and the "GAS JOURNAL" for March 14, 1928.

Standardization.—The British Engineering Standards Association have now issued the Standard Specification for:

(1) Street lighting.

(2) Translucent glassware illumination fittings for interior lighting.

In these cases the Society's representatives gave useful assistance.

Report on Gas Lighting.—Mr. Harold Talbot, Chairman of Section VII., presented a report on "Recent Progress in Gas Lighting" at the meeting of the Illuminating Engineering Society in November.

National Illumination Committee of Great Britain.—We have been invited to co-operate in the work of the National Illumination Committee, and have nominated Mr. Harold Talbot, Mr. F. J. Gould, and Mr. Philip H. Sugg as our representatives to serve on the Committee.

International Commission on Illumination.—Reference was made in the half-yearly report to the meeting of the International Commission on Illumination held at Bellagio at the end of August. The plenary session will be held in New York in September next; and Mr. Harold Talbot, Chairman of the Lighting Section, has been nominated our representative.

Refractories.—An important meeting of the Refractory Materials Joint Committee was held in the early part of last year to consider the revision of the standard specification of refractory materials as relating to the gas industry. Drastic alterations were proposed; and after a lengthy discussion it was decided, as there was such a diversity of opinion, to refer the matter to the British Refractories Research Association for investigation, so that the subject could be brought forward again for decision at a future meeting. Two meetings of the Refractory Section of the Ceramic Society, of which most of Section X. are members, have taken place during the year. In May the Society paid a visit to Czecho-Slovakia and Austria, under the chairmanship of Mr. Frank West, and there inspected a large number of works manufacturing refractories of all kinds. There was a good attendance, and the visits and meetings were very successful. The autumn meetings of the Society were held at Bournemouth in September, under the Presidency of Mr. H. J. C. Johnston, of the Leeds Fireclay Company. At these meetings very important papers were read and discussed. The members also visited several works in the district.

Reorganization of the Society's Functions and Alterations to the Rules.—The Council have for many months given serious consideration to the past, present, and future of the Society. A Committee were appointed and a report drawn up which has now been recom-

mended for adoption by the members at the annual general meeting. A copy of the report has been sent to all members. The Council feel that if the proposals are carried out the future usefulness and prestige of the Society will be considerably enhanced.

The prizes in the City and Guilds of London Institute Examinations in Gas-Works Practice, Gas Supply Practice, and Gasfitting have been duly awarded and announced in the Technical Press. The Institute state they are confident that the award of these prizes is an incentive to serious study on the part of their candidates; and from communications we have received it is gratifying to know that these prizes are much appreciated by the recipients.

The Society wishes to accord its best thanks to His Grace the Duke of Sutherland for his valuable services during his Presidency. On his retirement he has been pleased to accept the office of Vice-President; and we hope that we may long have the benefit of his counsel and advice.

We also desire to place on record our best thanks to Viscount Ednam, M.C., D.L., for his able and valuable Presidential Address at the last annual meeting, "Cheaper Fuel—Some Ideas and Observations;" also to Mr. R. B. Hodgson, M.I.Mech.E., Chairman of the Council, for his paper at the autumn meeting, entitled "The Romance of the Gasholder," which led to a good discussion.

We have much pleasure in announcing that the Most Hon. the Marquess of Hartington, M.P., has accepted the Presidency of the Society for the coming year.

On behalf of the Council,
R. B. HODGSON, *Chairman*.

REMARKS BY THE CHAIRMAN.

Mr. HODGSON said: The report has been distributed among you; and in view of the importance of our meeting this afternoon, and the short time at our disposal, it is not my intention to read it, as has been the custom on previous occasions. If you will refer to it, you will find that it contains much of interest; and there are one or two items upon which I should like briefly to touch. In the first place, may I say that a good deal of interest has been taken in the Society by the Council and its members this year? Our meetings and special Committee meetings have been numerous—much more so, I think, than in previous years. This has been necessary on account of the new interest which has arisen with reference to the re-organization and alterations proposed to be made to our rules; and I am hoping that to-day the report to be presented to the members for discussion will be received favourably and passed. In connection with The Institution of Gas Engineers, it is pleasant to report they have been able to go forward with their application for a Royal Charter; and I am quite sure they have our very heartiest good wishes. Anything that helps them in this direction must add dignity and prestige to the Institution and also assist the gas industry as a whole.

From the report it will be seen that the Society has from time to time this year taken part in conferences on Carbonization. It has also taken part in discussions over trade agreements, the standardization of materials, and the question of refractories; while this year one of our members, Mr. Harold Talbot (Chairman of the Lighting Section), has been appointed to attend the International Commission on Illumination, which will be held in New York in September. Another matter to which the Council have given very special attention is the British Industries Fair, Birmingham, 1928. We recognize that the Gas Section at the Fair organized by the Society this year was a genuine improvement on the previous year; and because of this fact the Society have decided next year to improve, if possible, upon the last one. With this object in view, they are organizing the Gas Section of the Fair in February, 1929, on bigger and broader lines. In this we are supported by the British Commercial Gas Association, the National Gas Council, and The Institution of Gas Engineers; and a very strong and representative Committee has been appointed to carry this through. Mr. R. J. Rogers, of Birmingham, who organized to a great extent the last exhibition, has, through the courtesy of the Birmingham Corporation Gas Committee, been appointed Secretary; and both the Society and the other bodies mentioned are preparing for the Gas Section of the Fair next year to be everything that can be desired, and thoroughly worthy of the gas industry.

The gas industry generally is in a fairly healthy condition; and it is interesting to know that within the last twelve months the whole of the work associated with two new gas plants being erected abroad—one at Johannesburg and another at Quebec—has been secured by members of the Society, against very severe foreign competition. Increase in the make of gas is reported all round in spite of the rapid advance of electricity; and I am sure that all our members, to whatever section they belong—whether it is concerned with the building of a 15 million c.ft. holder or the making of gas burners—are ready to do their utmost for the advancement and welfare of the industry. I have much pleasure in moving the adoption of the report.

FIGHT FOR THE LIGHTING LOAD.

Mr. R. J. MILBOURNE: I am very pleased to second that. It is a source of great gratification to find that The Institution of Gas Engineers, which has been in existence for so many years, is seeking powers to increase its sphere of influence; and I am quite sure that this will be to the benefit of the gas industry. It is to be hoped, therefore, that it may be possible to make at the forthcoming meeting of the Institution at Cardiff, the announcement of the granting of the Charter. I trust that the Gas Section of the British Industries Fair, 1929, will have the support of the whole of our members. It is up to us to see that it is considerably enlarged and improved, even beyond this year's good display. There can be little doubt that those of our members who exhibited last February have found that this Fair assists materially in the successful marketing of their products, and thus are fully satisfied with the results that have been obtained through participation in the Gas Industry Section. I do hope, however, that on the next occasion the Lighting Section in particular will be extended. One of the great mistakes which the industry is making at the present time is that it seems inclined to surrender the lighting load to our electrical friends. I do not think there is any necessity for that; and I believe that if the British Commercial Gas Association could be induced to employ some more of their means in advocating the greater use of gas for illuminating purposes, the industry would benefit, and we should be able to retain that very important load which a number of gas engineers appear at the present time quite prepared to relinquish.

The report was then unanimously adopted.

THE ACCOUNTS.

Dr. E. W. SMITH (Hon. Treasurer) then submitted the accounts for the past year, in which, he said, there was nothing that was exceptional. The total amount of money raised by the Society was £1570. There was a balance on the right side of very nearly £60; and the amount of money invested was just over £900. In fact, the financial status of the Society, within its present range of activities, was very sound. He would point out that many of the members of the Society had contributed towards the fund, amounting to over £2000, which went direct to the British Commercial Gas Association. This sum of £2000, *plus* the £1570 which he had already mentioned, indicated the total sum that had been raised by the Society from the members.

Mr. C. A. GOODALL seconded the adoption of the accounts, which was agreed to.

COUNCIL REPRESENTATIVES OF SECTIONS.

The PRESIDENT announced that the following gentlemen had been elected to serve on the Council as the representatives of the Sections:

Mr. G. J. Jackson	to represent Section	I.
Mr. J. Winson Scott	" " "	II.
Mr. Charles S. Bennett	" " "	III.
Mr. Samuel Cutler, A.M.Inst.C.E., M.I.Mech.E.	" " "	IV.
Mr. Thomas A. Braddock	" " "	V.
Mr. D. MacCallum Gibb	" " "	VI.
Mr. H. Talbot, B.Sc., A.R.C.Sc., M.I.Chem.E.	" " "	VII.
Mr. George Ewart	" " "	VIII.
Mr. A. B. Baimford	" " "	IX.
Mr. C. R. F. Threlfall	" " "	X.
Ald. George Clark, J.P., M.I.Mech.E.	" " "	XI.
Mr. Arthur H. Lymn, M I.Chem.E.	" " "	XII.
Mr. B. B. Waller, A.M.Inst.C.E.	" " "	XIII.
Mr. Frederick Dobson, C.C.	" " "	XIV.
Mr. E. J. Fox, M.I.Mech.E.	" " "	XV.

NEW CHAIRMAN AND VICE-CHAIRMAN OF COUNCIL.

Mr. B. B. WALLER said he counted it a special privilege that he should be called upon to propose the election of Mr. R. J. Milbourne, J.P., Assoc.M.Inst.C.E., F.C.S., as Chairman of the Council for the ensuing year. It was a special privilege because Mr. Milbourne was one of his oldest friends. The name of Milbourne was almost a household word in the industry; and the gentleman he now proposed as Chairman had been a very active member of the Council for some considerable time. He would in his new position do credit to the Society and to himself.

Mr. HODGSON said that, as another very old friend of Mr. Milbourne, he was delighted to second the motion. He had always found him a fair, upright, and honourable man.

The proposal was passed with acclamation.

Mr. Milbourne remarked that, in electing him to the position of Chairman, to preside over the deliberations of the Council during the coming year, he recognized that they had done him a great honour, and one which he much esteemed. He was, however, rather inclined to doubt whether it was a judicious appointment. A correct estimate of his own abilities prevented him from sharing the opinion which Mr. Waller had expressed. However, he was conscious of the fact that he had behind him a very able and a very zealous Council and officers; and it was to them that he would look for support during what might prove a rather trying year, seeing that the present Chairman was leaving him several "legacies." [Laughter.]

Mr. J. WILFRID DRAKE proposed the election of Mr. C. A. Goodall as Vice-Chairman of the Council. He pointed out that Mr. Goodall had been a very enthusiastic member of the Council; and he attended the meetings well, which was more than could be said for all of them.

Mr. JOSEPH CLAYTON seconded the motion, which was agreed to, and acknowledged by Mr. GOODALL.

OTHER OFFICERS.

Mr. F. J. GOULD, moving the re-election of Dr. E. W. Smith, F.I.C., as Hon. Treasurer, said that he was really

much more than that to the Society. He was one of their wisest counsellors; and they owed him a deep debt of gratitude for the care and attention which he gave to the interests of the Society.

Mr. A. H. LYMN seconded the motion, which was carried.

On the proposition of Mr. JOHN ORME, seconded by Mr. HAROLD TALBOT, Mr. E. J. Davison, M.I.Mech.E., was re-appointed Hon. Secretary.

Alderman GEORGE CLARK moved, Mr. CHARLES S. BENNETT seconded, and it was agreed, that Mr. R. B. Hodgson, M.I.Mech.E., be appointed an elective member of the Council.

Moved by Mr. E. J. FOX, and seconded by Mr. H. J. DONKIN, Messrs. F. J. Gould, Frank West, M.I.Mech.E., E. J. Davison, M.I.Mech.E., and H. M. Thornton, J.P., Assoc.M.Inst.C.E., M.I.Mech.E., were appointed elective members of the Council.

The re-election of Messrs. Cash, Stone, & Co., as Auditors was agreed to, on the proposition of Mr. T. A. BRADDOCK, seconded by Mr. E. J. DAVISON.

Mr. F. C. TILLEY proposed a hearty vote of thanks to the Council for the work done by them during the past year. It had been a period during which they must have laboured harder than ever. The report showed that they had tackled a great number of subjects; but, in addition to this, they had introduced what it was hoped would prove to be the commencement of a new era in connection with the Society, should the document to be submitted that afternoon be adopted by the members.

Major RICHARD MILES seconded the vote, which was heartily accorded.

Mr. HODGSON then proposed a vote of thanks to the Hon. Treasurer, the Hon. Secretary, and the Secretary for their services during the past year. Their Secretary, he said, worked hard and admirably for them; while as to Dr. Smith, he was one of the men in the industry who was universally known, and they were to be congratulated upon having him on the Executive. Dr. Smith was a "real live wire;" and in everything that had been done during the past year he had more than borne his share. Mr. Davison, too, worked hard for the Society.

Mr. MILBOURNE, in seconding, agreed that Dr. Smith was rendering an immense amount of service to the Society.

The vote was cordially endorsed by the meeting.

PRESIDENTIAL ADDRESS.

There appears to-day in the minds of many people a marked uneasiness in connection with the problems centred round the production and utilization of fuel. On the one side, extremists proclaim that oil will entirely replace coal, and on the other, that coal must be converted into oil in order to combat the almost immediate world shortage of natural liquid fuel, and provide Britain with an oil supply which would be adequate to her needs in the event of war. One may, I think, render a little service if these points of view are analyzed in the light of facts. I am, therefore, going to consider our national position in regard to fuel, and then, after discussing the present situation in the coal mining and gas industries, to indicate briefly in conclusion how these two great organizations can render mutual and national service.

The growth of the petroleum industry is phenomenal. In 1914 the world's oil production was 56 million tons; in 1927 it had risen to 170·84 million tons; and of this the British Empire produced only 1·7 p.ct., whereas the United States, which for years has been providing the world with oil, produced 71 p.ct.

At the outbreak of the war, the United States had the monopoly of oil production. To-day Great Britain controls, either directly, or indirectly through the capitalization of foreign companies, the major part of the world's future oil resources. It is clear, therefore, that as the oil production of the United States declines, that of our Empire and associated foreign companies will grow; and in the near future we shall lead the world in the production of this valuable commodity. In view of this, can there be any need, under peaceful commercial and international conditions, for low-temperature carbonization or hydrogenation of coal?

I see no reason why research upon the extraction of oil from coal should not be continued in order to seek the means of providing for a possible breakdown in international relations which may deprive us of our oil supply; but the best safeguard for this country is to see that our Navy is maintained superior to that of any other Power in the world.

The total imports of refined petroleum products and crude oil into this country in 1927 amounted to 2051 million gallons. It is difficult to obtain accurate information of the production of motor spirit and crude oil from coal and oil shales mined in Great Britain in the same year, but it may be estimated at 72 million gallons, which is only 3 p.ct. of our total consumption. This is arrived at from the following figures:

From Scottish Shale Industry.

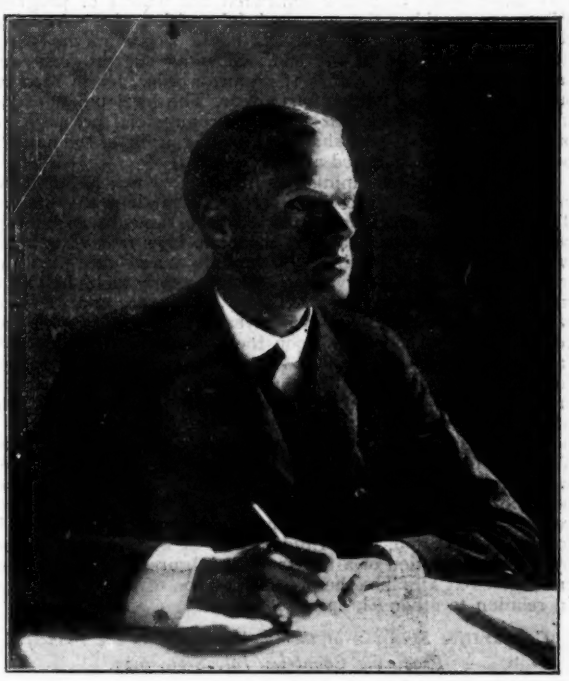
(2,047,263 tons mined.)

Crude oil content at (say) 23 galls. per ton	46	million galls.	crude oil	
Coke ovens	21	,, ,,	motor spirit	
Tar distilleries	3	,, ,,	,, ,,	
Gas companies	2	,, ,,	,, ,,	
	72	,, ,,	of motor spirit and crude oil.	

The world's annual output of coal is about 1100 million tons, of which Great Britain alone produces about 23 p.ct.

The main fields in which oil competes with coal and gas are in industry, shipping, and road transport. The latest information available with regard to power production in industry in this country is derived from the preliminary reports of the Board of Trade on the census of 1924. Of the total horse-power of 17¼ millions then produced, 89·5 p.ct. was from coal, and only 7·5 p.ct. by internal combustion engines; but of this, about 75 p.ct. was produced by gas engines. Thus only just over 2 p.ct. of the power produced in industry was derived from fuel oil.

The position in the shipping industry is not so satisfactory from our point of view, neither do the available facts allow of such accurate analysis. The current edition of "Lloyd's Register of Shipping" gives 28,967 steamers and motorships with a total gross tonnage of 63¼ million tons. This tonnage is divisible into that using coal only, amounting to 64 p.ct.; that using oil in internal combustion engines, amounting to 6·75 p.ct.; and that fitted with installations for burning oil in boiler furnaces, but not necessarily always using oil as fuel, amounting to 29¼ p.ct. It is difficult to estimate how much of this 29¼ p.ct. should be apportioned to oil; but be it large or small, the British mining industry must seek the means of replacing a good portion of it with coal. It has a good case to put forward in support of the use of coal alone in these ships. Coal is much cheaper, and if it is piped into the ships' holds in sizes of from 1½ in. to ⅛ in. (fines being excluded) and then elevated in bucket



PRESIDENT OF THE "S.B.G.I."

His Grace the Duke of Sutherland.

elevators to unit pulverizers, it can be burnt under boilers with the same flexibility as oil. This is purely a matter of marine and mechanical engineering. The ultimate gain to the shipowners by replacing oil fired boilers by pulverized coal fired boilers is, I think, unquestionable. Such a change cannot, however, be applied to the Navy, because the transference from oil to coal would seriously affect the fighting capacity of our ships. The Navy, however, consumes annually 750,000 tons of fuel oil and 500,000 tons of coal.

Road transport is an industry requiring the careful attention of our mechanical engineers, who will, it is hoped, in future, design their engines to use the cheapest fuel available in this country—which is coal—and not to suit their own fuel specification. The history of the development of road transport for freight and passenger carrying is illuminating. In 1802 Richard Trevethick made the first practical steam road-vehicle, and for a time from 1824 onwards a passenger service was run between Cheltenham and Gloucester. This enterprise was unfortunately killed by public prejudice and vested interests which took the form of prohibitive tolls and, later, legislative enactments, in favour of horse haulage and railways. For three-quarters of a century the public and the law forbade the use of mechanically propelled road transport. The development of the internal combustion engine paved the way for the repeal in 1896 of the prohibitory clauses in the various Locomotives on Highways Acts; and now, to-day, road transport is a rapidly growing industry. Had it not been for the introduction of this afore-mentioned legislation, it is not unlikely that engineers

would by now have produced a steam or producer-gas driven road-vehicle which would prove a formidable competitor to the petrol driven internal combustion engine. All road-vehicles could be run more cheaply on coal. If the Daily Press wishes to help industry, it can do no finer work than offer a prize of (say) £5000 for the best designed steam or gas driven car using coal for its fuel, running in competition with a petrol driven car. This would tend to set our mechanical engineers thinking in terms of coal, instead of oil, which, after all, is a much dearer fuel.

In our country at the present time there are about 9100 heavy steam road-vehicles consuming annually about a million tons of coal and coke, whereas there are about 273,000 petrol driven commercial vehicles, and there is a yearly increase of 170,000 in petrol driven vehicles of all types, including privately owned cars.

The welfare of the gas industry is so dependent upon cheap and suitable coal that a stable economic position of the coal mining industry becomes vital to its interests. Gas engineers have not the time to study the factors adversely affecting the coal industry, but their interest is such that they read with care the articles which appear all too frequently in our daily papers. The non-technical Press is in the unhappy position of not being able to judge of a person's fitness to speak upon the mining industry. The result is that many politicians and others who have ideas on, but no knowledge of, mining seek publicity at the expense of a much too belittled and belied industry.

Coal mining has seven centuries of tradition behind it, and this alone tends to retard somewhat the wheels of progress. When one considers the very doubtful position of the American coal industry to-day, one wonders if our slower methods may not serve us better in the end. Slow as our progress may seem in American eyes, it is of no mean order, for in 1800 our output was only ten million tons a year. The development of coal mining has been responsible for the commercial prosperity of our country; and its past share in the building up of the national purse must be encouraged and maintained.

At the moment coal mining is in very low water, but it has emerged successfully through worse times than the present. The cause and effect are essentially the same in each of its periods of depression—namely, economic laws following in the wake of bad trade, which hit unduly hard both men and masters. In addition, various other factors have helped to make the burden heavier. To-day, however, one of these, which has been steadily growing year by year during the past century, has loomed large upon the horizon—it is the political factor, which seeks to abuse the industry, making it a topic for perverse oratory. This abuse takes the form of adverse criticism of its technical efficiency and of the social amenities of its workers. Let us briefly analyze these factors. It is perfectly true that the main trouble to-day is an economic one. The coal industry has, however, always been able to compete with the foreign market at home, whereas its less fortunate neighbour, the iron and coal trade, has not. Since the recent coal strike its economic position has been made worse by foreign competition, the formidableness of which can be judged by the consideration of a few facts and figures. The following table gives at a glance the present position of the coal industry in relation to other European countries.

Comparative Statistics of the Coal Industry in the Principal Producing Countries, July-Sept., 1927.

—	Great Britain.	Ruhr.	Polish Upper Silesia.	France.	Belgium.
Approximate annual output, million tons	250	120	30	50	25
Number of persons employed in thousands	990	405	74	320	160
Wages cost per ton commercially disposable	10s. 4d.	8s. 4d.	3s. 5d.	9s. 2d.	12s. 11d.*
Total costs	15s. 3d.	14s. 10d.	6s. 6d.	..	21s. 2d.*
Earnings per shift . .	9s. 10d.	8s. 0d.	3s. 9d.	5s. 4d.	5s. 2½d.*
	9s. 7½d.†		3s. 9d.†		
Output per shift . .	20½ cwt.	22 cwt.	25 cwt.	12 cwt.	10 cwt.

* Figures for 1925 latest available. † Figures for Oct.-Dec., 1927.

The average price of coal to-day compared with the basic figure of 100 for the year 1913 is only 114 for export coal (f.o.b.) and 133 for home consumed coal, whereas the Board of Trade average index figure for all commodities is 141. What of the average wage earnings per person employed? We find that it is 149 per shift as compared with 100 in 1913. These figures are enough in themselves, but when in addition we consider that tariff barriers have been erected against our export trade by France, and we are placed in a very inferior position with regard to railway rates when compared with the Continent, it makes our outlook somewhat obscure. Railway rates are a severe handicap to-day. The average railway rate on all coal is 3s. 8d. per ton, which is 83 p.ct. greater than in 1913, whereas the percentage increase in Germany for the same period is just over 40 p.ct. Actually it costs 3s. 4d. per ton to transport coal by rail from Upper Silesia to Danzig, a distance of 393 miles, whereas the rate from South Yorkshire to the Humber, a distance of 50 miles, is 5s. 5½d. Our export trade is about two-thirds of what it was in 1913; but when one considers the foregoing facts one feels that there is not much wrong with the organization of the industry. What of the political issue? There are, I believe, about 175 members of Parliament directly or indirectly interested in coal, either from the employers' or the employees' standpoints. The result is that the mining industry has become an issue of first-rate political importance. Those who know least about the industry are the first to suggest schemes of re-organization. I say emphatically that there is no hope for this country so long as coal mining is allowed to remain a pawn on the chessboard of political opponents. The social amenities of our miners are as good as, and in most instances better than, those existing in any other country. The cost of social services per ton commercially disposable in 1927 in the form of rates, health and unemployment benefit, workmen's compensation, and welfare was 12·38d., as compared with 3·98d. in 1913.

I must refer now to the technical efficiency of the mining industry. I am informed by those who have studied mining conditions in Europe and America that the British collier and mining engineer are the best in the world. This is due to the fact that they combine humanity with technology and practice. The mining industry is by no means perfect, but many of the criticisms levelled against it are false and politically biased. The system of marketing coal calls for far more improvement than underground mining operations. If every coalfield, or parts thereof, pooled its coal output, and sold its coal to specification with the object of giving complete satisfaction to all buyers, a different outlook and a brighter future would result. Furthermore, I should like to see the industry attracting first-rate brains by its willingness to pay really good salaries, and a bonus for maintaining peaceful conditions in the industry, and for profitable working. The industry badly needs young men with brains and capacity for leadership to fill the terrible gap created by our loss of manhood in the Great War.

The gas industry is one of the most efficiently run of British industries, and this is because it contains some of our best brains on its large chemical and engineering staffs. The three largest gas undertakings—namely, the Gas Light and Coke Company, the South Metropolitan Gas Company, and the Birmingham Corporation—produced between them in 1926 a quarter of the total output of gas for the whole of the British Isles. This represents an increase of 28½ p.ct. on the year 1922, whereas, taking Great Britain as a whole, the increase in gas consumption during the past twenty years was 68 p.ct. Every large city can show an increase in the installation of gas cookers and fires. The increase of gas fires and radiators during the past five years in the City of Birmingham alone was 76 p.ct.—a figure which again tends to prove the fallacy of low-temperature carbonization.

Now allow me briefly to consider the mutual service which the gas and the mining industries should render each other in the national interest. The coal owners would, if they were called upon to do so, supply coal, or even a blend of coals, to a specification drawn up by the gas industry. This points to the necessity for coal owners to set up marketing centres for the supply of coal for each of the large coal consuming industries. With this help the gas companies can cheapen their products and extend their spheres of activity. It must not be forgotten that the recent strikes in the coal industry have created a new demand for oil cookers and heaters in rural districts. This demand is, of course, temporary, for gas will most certainly prove a serious competitor.

In conclusion, I trust that this cursory review of the position of fuel will be helpful to some, at least, and that it will stimulate this great gas industry to still further endeavour in the national service.

Vote of Thanks to the President.

Mr. Hodgson said that he had to fill a gap, because Viscount Ednam, who was to have been present to propose a vote of thanks to the President for his address, was not with them. They had had a message saying he was sorry at the last moment to find that it would be impossible for him to attend the meeting. Everyone present must admit that their President had given them a well-reasoned and interesting address on the fuel problem. Many of them knew that his (the speaker's) interests lay as much on the side of oil plants and their manufacture as on that of the gas industry. He had just read in one of the oil papers the Board of Trade returns, which showed that the quantity of oil that came into English ports in the previous week amounted to 53 million gallons. The coal trade had therefore, as the President had pointed out, a considerable competitor in this oil. He had personally been much surprised at the figures quoted in the address, showing that in this country at the present time there were about 9100 heavy steam road vehicles, whereas the number of petrol driven commercial vehicles was round about 273,000. These were figures which should give them all food for thought. No one was more fitted to speak upon the coal question than their President, who had placed before them in clear terms the position as it existed to-day. It was gratifying to hear the President refer to the gas industry as being one of the most efficiently run of British industries. There was no doubt that the gas industry was one

of the great staple industries of the country; and the improvements which have been brought about within (say) the last twenty-five years constituted something of which they might all feel proud. The address was well worthy to take its place among the long list of valuable addresses which the Society had had from its Presidents.

Mr. B. B. WALLER seconded the vote, which was carried with acclamation.

The PRESIDENT said it had been a pleasure to him to do what little he could to help the Society; and he would continue to be at the service of the members, ready to do them a good turn should the opportunity present itself.

DEVELOPING THE SOCIETY'S ACTIVITIES.

[Report presented for Discussion and Adoption.]

The Society was founded in 1905 to promote the interests of all connected with the contracting side of the gas industry, and to further the welfare of the gas industry as a whole. At the present time about 140 firms are members of the Society, and these firms are represented on the Council through fifteen groups of varied interests.

The scope of the possible activities of the Society is practically unlimited, although it has not the right to promote schemes for the restriction of trade, price arrangements, rings, combinations, or other matters connected with trade, savouring of the functions of a trade union among contractors. It is largely a technical body, and one of the integral parts of the gas industry. As such it has a great responsibility; and it is the object of this report to examine to what extent it has assumed its full share in the past, and how it may develop its functions in the future for the benefit of the gas industry as a whole and the contracting side in particular. The interests of the latter are identical with the interests of the whole industry. Permanent good cannot come to one side without it being for the benefit of all sides; but weakness in one link can only mean weakness for the whole.

It is therefore desirable that the activities of the Society should be reviewed and, if thought advisable, be materially extended. What has the contracting side and the Society done for the gas industry? This can be placed under a number of heads:

TECHNICAL DEVELOPMENT.

It will readily be conceded that a large part of the technical development of the gas industry can be put to the credit of the contracting side, whether considering gas production, distribution, or gas burning equipment. It is the essence of their business to invent, develop, or acquire improvements in accepted practice, and to place these at the disposal of gas undertakings. It is unnecessary to give an elaborate set of instances, as one has only to review the advances of the last twenty years to appreciate that most of them have only been made possible through the progressiveness, finance, far-sightedness, and enterprise of the contracting side. This work covers exhausters, valves, holders, carbonizing plants, chemical recovery plants, domestic heating appliances, lighting burners, cookers, and so on; and it is quite safe to say that to-day a sum exceeding £200,000 per annum is being spent by the contracting side in research and development on behalf of the gas industry.

It may be said that this is one of the essentials for the continued existence of the present contracting side; but that does not eliminate the basic fact that the gas industry largely depends on the contracting side for its present position and its future progress. It will also be accepted that directly and indirectly a large proportion of gas undertakings look to contractors of all kinds for advice, not only as to detail, but many times as to policy on a multitude of matters which fifty years ago would never have been referred to contractors, because of the simpler conditions that held at that time.

FINANCE.

One of the most valuable sides to the gas industry is its efficient Technical Press. The whole industry is dependent on it from many points of view. Is it generally realized that, but for the extensive advertising revenue of all these papers received from the contracting side, these journals could not be published unless finance were obtained from another source? Over £40,000 per annum is spent by the contracting side in advertisements in the Technical Press. It may be admitted that this is not by any means philanthropy; but at the same time it does make possible the continued existence under most efficient conditions of an independent Technical Press, fundamentally an activity on which the progress of the industry largely depends.

The Society annually raises a fund to assist the general publicity work of the British Commercial Gas Association. The fund is raised by means of a special appeal to all the members. There is a considerable divergence of opinion among the members as to the justification for such a contribution from the members of the Society. It is felt by some that the British Commercial Gas Association should look solely to gas undertakings for its main revenue. Our members have their own publicity in the Technical and Daily Press, and indirectly the expense entailed comes from the gas undertaking, as the price paid for our goods must include all expenses; and eventually all such expense, whether borne directly by the contractors or by the gas undertakings, is passed on to the consumer of gas. It is thought that it would be much simpler to let all the revenue for the main expenditure of the British Commercial Gas Association come direct from gas undertakings themselves. If this general policy were adopted, it would not preclude the possibility and advisability of the Society financing to a larger extent than it is doing to-day publicity work in connection with many special enterprises and schemes that may be put forward from time to time. Whatever policy is adopted in this respect must be loyally adhered to by all members of the Society, who must act with the rest of the gas industry through the Society; otherwise they may be subject to—directly or indirectly, wittingly or unwittingly—a form of undue pressure to support as individuals various funds or associations. If all work together, this tendency can be eradicated, and the gas industry as a whole will materially benefit, as it is felt that in future the Society shall have a much greater control over what funds it does raise and the increased funds it proposes to raise.

The Society in this respect would be well advised to forestall discussion by claiming:

1. That its members are interested in the welfare and progress of the gas industry as any other body.
2. That it has the right to its own views as to what is best for the gas industry on matters of policy.
3. To have the right to use its own funds in its own way without pressure from outside.
4. The right to be adequately represented on Joint Committees and Associations dealing with matters of interest to its members.

The Society has recently adopted a much more restrictive policy as regards gas exhibitions. It is desired that in the future the policy shall be more systematized. In the past, if a local exhibition has been mooted, one firm has been pitted against another; and in many cases local exhibitions have eventually been run at the expense of the manufacturers. This has meant waste, duplication, and much unnecessary expense, whereas if a local exhibition is required it should take a non-competitive composite form, largely at the expense of the undertaking concerned.

The Society is wholly in favour of national exhibitions, and is spending more than £20,000 a year through its members in connection therewith. The practice of bringing undue pressure on members to support local exhibitions should be stopped.

The Society has much good work to its credit, and none more important than the following:

1. The prestige value to the whole gas industry of its long line of illustrious Presidents, taken in conjunction with the standing of its annual dinner, equal, at least, with any other function in the gas industry.
2. Its work on Joint Committees.
3. Its work in connection with—
   - Standard conditions of contract.
   - Refractory materials development.
   - Exhibitions.
   - Education.
   - Standardization of materials.
4. The instructional assistance given to Junior Associations in visits to works and the technical papers given before the Societies of the industry.

It will be realized from what has already been said that the Society has more than justified its existence; but there is a very strong feeling among the members that it must take its place, through increased merit and usefulness, on a parity with other organizations. There are plenty of those among the members who are fully capable of representing with dignity, experience, technique, and ability, one of the most important sides of the industry. The two main requirements are:

1. Ample funds to support a properly directed policy.
2. The creation of sufficient confidence in the minds of the rest of the industry in the integrity of members to enable all of them to collaborate in joint work for the good of our common industry and its continuance on strictly business lines, eliminating all undesirable practices.

With a view to improving the effectiveness of the Society, your Council make the following proposals:

1. That in addition to the annual subscription a fund be created to finance the special activities of the Society.
2. That the basis of the annual contribution of the members of the Society to this fund shall be 10s. per £1000 of the business transacted directly with the gas industry, and that the members of the Coal Section be asked to contribute at the rate of 2s. 6d. per £1000.
3. That the following additions shall be made to the rules:
   - (*a*) That it shall be obligatory on each Section to hold at least one meeting each year, and that the Chairman of each Section shall annually present a report to the Council on the work, activities, and interests of the Section and its members during the past year.
   - (*b*) That the Society may promote research in connection with problems of general value to the Society, or join with other bodies in promoting research under the same conditions.
   - (*c*) That the Society may subscribe to any specific funds organized for development, research, and publicity on behalf of the gas industry.

OBJECTS OF THE FUND.

The basis of contributions is put forward only as a guide to members. The Society has representation on the British Commercial Gas Association, and it is proposed to continue to contribute to the general revenue of the Association.

It is also proposed to reserve a further allocation for special joint publicity work to be used as occasion demands.

It is also proposed to assist suitable joint research work in conjunction with other bodies as occasions arise, and to finance special lectures and lectureships, &c.

The Society must adopt a forward policy. There is in it an organization and personnel that are of the greatest value to the industry. The industry cannot afford to waste any available material, and the members of the Society cannot afford to use their time on behalf of the Society in any but the most effective way. Your Council believe that the proposals they are putting before you are but the beginnings of important developments.

R. B. HODGSON,
Chairman of the Council.

To Bring the Society Up to Date.

Mr Hodgson: We now come to a very important part of to-day's proceedings—the consideration of a report upon the past, present, and future of the Society which has been carefully drawn up after a considerable amount of deliberation on the part of the Committee that was set up to prepare the suggested alterations to the rules. The report has also been the subject of much discussion on the part of the Council during the past three months. The Council have for some time felt the serious need of some changes in the rules, as, after an organization has been in existence for twenty-one years, it is only natural that some of its methods may need revising. In order, therefore, to bring the Society up to date, the Council have given serious deliberation to such alterations, and submit them for your consideration to-day. The Society being a body entirely interested in the manufacture and production of gas, it is necessary that it should be alive to every interest in the gas industry; and the object of the alterations is that the scope of its operations may be extended, and made more useful.

The Society for twenty-two years has operated with very good and valuable results—time and again interesting itself in propagating research in nearly every branch of the industry. Hence to-day we have in every branch of that industry adopted methods, and installed plant, based on the latest scientific principles, enabling us to produce gas on the most economical lines. The last few years have seen big developments, which have proved again and again the progressiveness, enterprise, and wider outlook of the contracting side. This has been encouraged by the wisdom and foresight of the large gas-works and other manufacturers, in adopting and putting in operation many new undertakings that have proved advantageous and remunerative to them. I refer to such things as vertical retorts, waterless gasholders, gas furnaces, plant for cooking, heating, and lighting, and the many useful appliances for the extensive consumption of gas. The Society has assisted again and again in exhibitions, and, in conjunction with The Institution of Gas Engineers, arranged a standard for contract conditions, which has repeatedly proved of valuable assistance to both the gas engineer and the contractor. It has interested itself in education, in the endeavour to standardize materials, and, through the British Commercial Gas Association, has assisted very largely in publicity work. Generally speaking, the Society has much good and solid work to its credit.

I should like to emphasize the concluding paragraph of the report: "The Society must adopt a forward policy. There is in it an organization and personnel that are of the greatest value to the industry. The industry cannot afford to waste any available material, and the members of the Society cannot afford to use their time on behalf of the Society in any but the most effective way. Your Council believe that the proposals they are putting before you are but the beginnings of important developments." This being so, I have much pleasure in moving that the report be adopted.

A Desire to Shoulder Responsibilities.

Dr. E. W. Smith: I do not think there is much that can be usefully added to what the Chairman has already put before you. He has explained in a most lucid and enthusiastic way what is the attitude of the Council of the Society; but as one of the more junior members of the Society—indeed, of the gas industry—and not as one who is desirous of rushing too quickly into anything, I wish to put before you my personal feeling that, if the Society is to continue at all, the only justification for its continuance would be that it should take its place on a parity with any other side of the gas industry. That is not a claim for position, but a desire to shoulder the responsibilities which we, as probably the most responsible side of the gas industry, should shoulder. ["Hear, hear."] Before any advance can be made on the technical side of the gas industry, we have to spend years in developing the processes and schemes and ideas. All this we have to do prior to the gas undertakings themselves adopting such schemes. This is a very serious responsibility. It is not sufficient that the Society should work quietly in the background. Because they have that responsibility, it is essential that they should have a full say in all those matters that affect the policy generally of the gas industry as a whole.

It may be said quite truly that the Society is fully represented on the national bodies. It is. But it is a sort of "dog's hind leg" method of being represented. It is an indirect representation. We, as a Society, have at least our proportionate representation on all national bodies; but when you get there, what are five or six out of hundreds? You may say that numbers do not count, and that personality and ideas are always effective; but I put it to you that private, individual members of this Society, on the contracting side, cannot, as a matter of policy, act strongly before organizations which have the placing of contracts. The only possible way for this Society to make itself felt—I do not mean against other organizations, but with other organizations—is to act as a society, and for all members to support their Council, and to support their Society, in working for the development of the gas industry as a whole in conjunction with the other bodies which also represent the industry.

Brains and Money Essential.

In order to do this, funds are required. It is quite useless for any society to pass pious resolutions, and to make recommendations which are not backed up with power. Now, there are only two things that matter in the organization of any industry. One you may call brains, or ideas; the other is the necessary finance to see a thing through. The basic principle of these recommendations is that there shall be ample funds available to support the proposals that the Society will put forward in the future for joint action with the rest of the bodies in the industry.

It has been stated on many occasions that we do not "carry our weight." That is always intended to mean that we do not carry our weight financially. This report indicates that, directly and indirectly, we are very largely carrying our weight financially; but we desire, and intend, that we shall carry our weight—not "throw our weight about," but carry our weight—still more effectively, by taking part in all the activities connected with the industry in which we should take part.

Basis of Contribution.

There may be discussion as to the basis of contribution suggested. There is no intention on the part of the Council to indicate that there will be anything in the form of a levy. It is very difficult to get down to a basis which will be absolutely water-tight and hard and fast, even if it were advisable to do so; and the Council put forward their suggestion really as a guide. If members want a rough idea of what other people are doing, they should be invited to consider the matter on a basis of 10s. per annum per £1000 of the business transacted directly with the gas industry. There may be some companies that would feel, on the margins on which they work, it ought to be more; there may be other companies in whose case it could justifiably be less. The coal industry, for instance, has been specially catered for by indicating that its contribution should be on a basis of one-quarter of that of the rest of the industry, because margins are very much smaller; and there may be other sections of the industry where the margins will vary.

The Council therefore want it to be very clearly understood, first, that it is not a condition of membership that firms should subscribe on this basis if the rule is passed; and, secondly, that this basis is put forward merely as a guide to the amount of subscription. I would point out that, at the rate of contribution suggested, a concern having a turnover of £50,000 per annum would subscribe £25; with a turnover of £100,000, £50; and with a turnover of £500,000, £250 a year. These are not very big figures; but the Council feel that if all members would subscribe on this basis, they would receive a sum of money which would in the beginning be adequate for the developments which they have in mind. Lastly I would put it to the members that the report as a whole, as distinct from our finances, is just a beginning of what we feel we ought to do. Before we can accomplish anything at all that is really worthy of the Society, some such basis as this report must be adopted. I have the greatest possible pleasure in seconding the adoption of the report, which I strongly recommend the members to agree to.

After a brief discussion, the report was unanimously approved by the meeting.

The New President.

The President said they had now reached another important stage in the day's proceedings—namely, the induction of the new President. It was with a feeling of sadness that he parted with the beautiful badge of office; but in passing it on to his successor, he felt that he was handing it to a very worthy person. The name of Lord Hartington was a household word, and a tradition in British public life. The Society would certainly benefit materially from the Presidency of the present holder of that name. [Applause.]

The Marquess of Hartington said he was deeply sensible of, and grateful for, the great honour that had been done him in electing him President of the Society. "If," he went on, "you compose all your difficulties so rapidly and easily, and so amicably, as you have just settled a somewhat troublesome problem, I am quite sure my year of office will be a very happy one indeed." [Laughter.] In conclusion, he remarked upon the fact that he is connected with the only production—and that on a small scale so far—of natural gas in this country. This is from the Hardstoft borings.

ANNUAL DINNER.

In the evening the members, together with a large number of distinguished guests, met again in the Hotel Cecil, where the annual dinner of the Society took place. The President (His Grace the Duke of Sutherland) was in the chair; and on his right hand there sat: The Right Hon. Lord Darling, P.C., Sir David Milne-Watson, LL.D., D.L., Mr. R. B. Hodgson, M.I.Mech.E., the Right Hon. John R. Clynes, M.P., P.C., Mr. Reginald G. Clarry, M.P., Alderman George Clark, J.P., M.I.Mech.E., Col. C. F. T. Blyth, C.M.G., LL.D., Mr. F. C. Tilley, M.I.Mech.E., Mr. F. W. Goodenough, C.B.E., Mr. Frank H. Jones, M.Inst.C.E., Mr. B. B. Waller, Assoc.M.Inst.C.E., Mr. L. J. Blackburn. On the left hand

of the President were: The Most Hon. The Marquess of Hartington, M.P., Mr. R. J. Milbourne, J.P., Assoc.-M.Inst.C.E., F.C.S., Mr. A. W. Smith, the Mayor of the City of Westminster (Councillor Jacques Abady), Mr. Charles Clare, Mr. John Terrace, M.Inst.C.E., Mr. Frederick J. Gould, Mr. W. H. Bennett, Mr. Cyril Davis, M.I.Mech.E., Mr. W. E. Price, A.M.Inst.C.E., Mr. Walter T. Dunn, F.C.I.S., M.I.Mech.E., Mr. Edward J. Naldrett, K.C., and the Secretary (Mr. Arthur L. Griffith).

The Right Hon. Lord Darling, P.C.

Lord DARLING, after the Loyal Toast had been honoured at the call of the President, said: It is a great honour, and also a great embarrassment, to me to be called upon to propose the toast of "The Society of British Gas Industries." But though an embarrassment, it is also a pleasure. I have long been of opinion that the different inventions, what Lord Tennyson called the fairy tales of science, have become a perfect menace. Every day one is called upon to live in a more scientific fashion; and I am much too old to enjoy being taught anything. In fact, I suppose, like most people, I do not feel sure that I ever did enjoy being taught. But to be taught in one's old age by people hardly yet out of the nursery is very humiliating; and that is what happens to me. It is impossible to take up the lowest-priced newspaper without finding that there are numbers of people, who have never studied it themselves, quite ready to teach persons like me the law. If I am offered a book, it is always recommended to me on the ground that it is the very latest view concerning the law, and detectives, and judges by somebody who knows nothing about either one or the other. Of course, I need not tell you that I have still strength of mind enough left to refuse to look at the thing. [Laughter.] But it is peculiarly interesting to me to-night to be allowed to propose this toast, because you are engaged in discoveries and in an industry with which I have the fullest sympathy.

CHANGES WROUGHT BY SCIENCE.

As I have said, various discoveries of science have made this world hardly worth living in. That will not embarrass me for very long; but I cannot help feeling sorry for the youngest of you. When first I came to London, it was far quieter than are most of the country villages to-day. Look at the roads. The roads of London when I first knew them were not unlike the country roads of to-day. The buildings were about one-half the height. This hotel, I am glad to say, did not exist. [Laughter.] It was the same with any number of sites in London which are now covered with buildings that make me think (though I have never seen that city) it must be like New York. Well, now the thing has got to a point where I am glad to think that the disease must produce its own cure; and if I could look forward to living another century or so, I feel that I should know the country as it was, let us say, in the time of King Alfred, or, to come to more recent days, in the time of King Henry II., who ordered that the judges—people who occupied exactly the position that I did, the judges of the King's Bench—should ride the circuits throughout the kingdom, holding assizes in the very towns where I have held them, and where others are holding them now. They travelled along over the downs, where there was hardly a road, breathing fresh air, stopping now and then to hunt—not the fox, because the fox was looked upon by our Norman ancestors as vermin, but to hunt the deer, and altogether living a pleasant outdoor life. And things went on like that for a very considerable time. If one put to sea, one trusted to the wind to carry one. "The wind that bloweth where it listeth"—and our ancestors went with it. The consequence was that they founded, in bits here and there, an Empire on which the sun never sets; but they have left us a terrible task to keep the flag flying.

And what is the position now? Of course, I cannot help regretting to find England what it is. Look at the roads. There are people

who think they are not wide enough. I think they are far too wide. They think them not smooth enough. I think them far too slippery. It is more dangerous now to ride 100 yards along the road than it is to ride 500 yards across country. More people are killed upon the road; but you may say it is their own fault—they should not get near it. All this, however, to me, accustomed to something totally different—is very painful.

Coal and Oil.

Now I come to the point of why I enjoy proposing this toast. All these evils from which we are suffering are due to the fact that we have discovered coal and oil, and that we have not yet exhausted the supplies of them. That is why I dislike it when I find, as one so constantly does, that those employed at the collieries have gone on strike. My desire is that the coal should be worked out as quickly as possible; but the strikes occur so often and endure so long, that I shall never, never see the country devoid of coal. [Laughter.] And the same with oil. When I was young, I think, people did not know there was any oil, except sperm oil and castor oil (which I know I always much objected to); but they have discovered all sorts of oil since then. From this coal and from these oils you are engaged in making gas; and I believe you make enormous quantities of it. You burn it in all manner of ways; and, in fact, I hope you waste it as hard as you can. You even supply people—and there are too many people—with the means of committing suicide. When I was young, people, if they wished to commit suicide—and they did, even when England was better than it is—took rat bane or something of that sort; but now they place a penny in the slot, put the gas pipe in their mouths, and in the morning they are gone.

The Millennium.

Now, I like to know you are applying every scientific means you can to get rid of all the coal in England and in the world, and of all the oil; and what will be the result? The result will be that we shall relapse into those days—those agreeable days—when Edward the Confessor was building Westminster Abbey. There will will be no more smoke. These roads we know will cease to be slippery. There will be no by-passes; and nobody will exceed the speed limit. There will not be any spirit, and there will not be any gas; but you will all have gone. [Laughter.] So you will not regret this millennium. I like proposing this toast, because you are engaged in advancing the arrival of the millennium, as I see it in imagination, though I know that I shall never enter into the promised land which you are doing your best to prepare.

His Grace the Duke of Sutherland.

The President: I thank you very much, on my own behalf and on behalf of the Society for the kind way in which you have received this toast, and Lord Darling for the very amusing speech he has made. If Lord Darling would write a book about the millennium, when all gas and all coal and oil are exhausted, it would be a most interesting production. Think of us shivering over a little wood fire on those winter evenings! Think of our cold houses! We are very glad to have Lord Darling with us, and to hear such a witty speech from one who has done so much to enliven British public life.

Great Work of the Gas Industry.

I sometimes wonder if the general public realize the extent and importance of the gas industry in Britain. They will realize it more if they read Lord Darling's speech; but I wonder if they realize its true importance. People know—or rather, they knew, for these things are quickly forgotten—that but for the gas industry we could not have won the war. As you are aware, it was only the by-products of the gas industry which made possible the large-scale production of high explosives in the first years of the war. I would go on to say that, if without gas we could not have won the war, so without gas we could not enjoy the peace. It is generally unknown, I think, that nineteen people in the country out of every twenty are users of gas in some capacity or other. The gas industry is one of the oldest trading public services. That is also often overlooked, and our work taken too much for granted. We find the proof of this everywhere. The Press is full of references to the latest developments in electricity, artificial silk-making, telephony, and television; but there is little mention of the solid achievement and progress of the gas industry.

The Society.

Yet our Society includes in its membership the large majority of contracting firms doing business with the gas industry; and we know what is being done. We know that the turnover of members of this Society lies between 10 and 20 million pounds a year. We know that, through the activities of the Fuel Research Board and the National Fuel and Power Committee, the contribution of gas to the national welfare is clearly recognized. We are glad of the success attained at the Birmingham Section of the British Industries Fair this year, in connection with the Gas Exhibit. [Applause.] That helped to make known the extent and importance of our industry. We hope for still greater success on the same lines next year. Members of this Society are responsible for the great bulk of technical developments which are taking place in the gas industry. I refer to methods of carbonization, and improved gas fires, gas cookers, and lighting burners. While I am speaking of such technical developments, I might say that the Society welcomes the proposals of The Institution of Gas Engineers to include only those who are technically proficient, though drawn from any section of the industry.

Important Problems Facing the Nation.

The most important problems which the nation has to face in industry are three: To restore prosperity to the coal industry; to eliminate the wasteful use of raw coal; and to increase enormously the production of fuel oil. It has been claimed that low-temperature carbonization can solve these problems. Though I speak as a layman, I believe I have the highest authority for saying that low-temperature carbonization cannot do more than scratch the surface of these problems. It might produce 10 million tons of solid smokeless fuel each year, and a corresponding quantity of fuel oil, thus aiding certain individual pits; but it cannot cope with an annual output of 300 million tons. Clearly, then, it is left for the gas industry to tackle these problems on a national scale. Only gas engineers are likely to find a satisfactory solution, if one exists. If they find such a solution, it would renew the activity of British coal mines, and provide a domestic source of the fuel oil which is essential to the nation in peace, and vital to it in war. If success is reached, the country will be under yet another debt to the gas industry; so let gas engineers get busy. Already it owes to us ability to develop two key industries—dyes and fine chemicals. The gas industry, by these and more familiar services, daily makes the life of our people possible, in spite of what our guest thinks. The gas industry of which this Society is an important and integral part, is, I believe, one of the great public services in this country. Ours is a true co-partnership between producer, consumer, and community. We can each help one another; and from the prosperity of each part the others benefit.

The Right Hon. John R. Clynes, M.P., P.C.

The Right Hon. J. R. Clynes: I am privileged to submit to you the toast of "The Gas Industry," in a speech which will be merely an effort to drive in a peg upon which Sir David Milne-Watson can make the speech of the evening. In the presence of so distinguished a representative of the law as Lord Darling I dread to plunge into a speech of any length. The playmates of Lord Darling existed in the days when gas was in its infancy; and no doubt he could recall many amusing incidents. For gas, like so many other immense successes, was deemed at the start to be doomed to failure. Most of the great things of modern life are things of which it was said at one time that they never could be done.

The Standpoint of the Workmen.

Naturally I look at gas, at least in part, from the standpoint of the conditions of the workmen engaged in the industry. I mean not only the men who are employed in manufacturing the innumerable parts of the machinery and plant required for gas production, but the men who are engaged in the making of the gas itself. Of course, anybody coming from the House of Commons to a gathering like this must be pre-supposed not to be entirely ignorant of the gas industry; but I can go back some 35 or more years, to the time when I was a very junior trades union official. It was my task to try to organize into a Trades Union the gas workers in different parts of the country; and I cannot help contrasting their conditions then with the conditions of the present day. They had long hours—usually twelve-hour shifts. They had scarcely any holidays, scarcely any overtime rates, and none of those amenities, advantages, and privileges that the more enlightened management of these times has placed at their disposal. I rejoice in the very substantial improvement that has been brought about in the conditions of the men employed in this great industry; and I join with the Chairman of this gathering in paying tribute to the industry itself. It has been a great public benefactor. It has provided the country with services of immense usefulness, and has been a big factor in the development of British trade and industry generally. Although the making of gas and of the various forms of plant and apparatus required for its production are not pursuits into which a man can put a few pounds and lift out at once a great amount of money, they are pursuits into which a man can put brains and inventiveness; and regarded in that sense they are a far finer contribution to the country and to the world than some of those businesses out of which fortunes are made in a night, sometimes at the later expense of the industry itself.

The Industry's Contribution to Improvement.

We can congratulate the gas industry upon having made a real contribution on the moral and character sides of working-class conditions. I have seen the most wonderful changes in the neighbourhood of gas-works—bowling greens, tennis courts, cricket pitches, social clubs and institutes, mess-rooms, and other developments which have tended enormously to humanize the relationship between employers and employed. [Applause.] Sir David Milne-Watson has again to-day been engaged in discussions with his fellow employers and with the representatives of organized labour in this country. On that I will only say that while a state of complete co-operative action may be unattainable as between these two different interests, it is worth striking for. Most of the great things of life have come about as the result of experiment and endeavour; and if we do not try to reach the point of co-operation, it never will be reached. Even if finally we find that it is unattainable, there will be some satisfaction in having found out that it cannot be done, and in knowing that we have done our best to attain it. Assuming that complete co-operation is unattainable, there are certainly many points upon which the two sides can find common ground for joint action. They have many mutual interests, to advance which they must work together. Sir David possesses technical and other qualities of which it would be improper of me to speak; but these qualities have in no way diminished his other great characteristics of sympathy and a desire to be fair with those with whom he has dealings. The proof of this was seen in the great gathering which assembled only a few days ago in Olympia to pay Sir David a tribute not only rare, but perhaps unparalleled, as between a leader of men and those whom he controls. It is because of that human touch and that sympathy to which I refer that so large a number of his employees were gathered together on the occasion to which I allude. [Applause.] I would like to see that spirit pervade more and more the relations between employers and employed. After all, this is our country, and we have to make the best of it. We are born here, and judging from what Lord Darling has said of the state of our streets, we are likely to die here; but meantime it will serve the purpose better of those of us who live this day and those who are to follow if while we are here we do our little bit to advance a stage further towards the light.

I therefore submit with the greatest sense of privilege the toast of "The Gas Industry," coupled with the name of Sir David Milne-Watson.

Sir David Milne-Watson, LL.D., D.L.

Sir DAVID MILNE-WATSON: I have to thank Mr. Clynes extremely for the kind way in which he has proposed this toast, and you gentlemen for the manner in which you have received it. I was almost as much touched by Mr. Clynes's kind words now as I was last Saturday night by the big gathering at Olympia. I feel, however, that what he says only means that one has got to keep on trying and striving to bring about in one's own way, quietly, conscientiously, and continuously, the aim and object of all those who have the welfare of this great industry at heart—namely, a better and happier relationship between all those who are engaged in working for it.

SEEKING THE HAND OF THE GAS INDUSTRY.

The gas industry has always been perhaps a rather humdrum, quiet, and respectable industry—I was almost going to say a *bourgeois* industry. For years and years we have been neglected, and most people have referred to us more or less as the "poor old gas industry." To-day, however, we find ourselves really in a rather different position. Having been so long respectable, and if you like to say so middle class, now the world turns its eyes once more to the gas industry; and it is with great interest we notice the old and aristocratic coal industry is seeking to open up relations with us. [Laughter.] They—and I may say that my remarks are not meant in any way to be personal—having squandered a large part of their substance, are now looking to this respectable relation, this middle-class gas industry, for some help. They desire a closer alliance. They would like to draw nearer to us, with questions of coke oven gas, and such like. In fact, they are very anxious to cultivate our acquaintance. We are quite glad to welcome them, and hope to remain good friends; but we do not propose exactly that they should live on us. Then we have also to deal with another band of friends, the electrical industry, who, I might say, in our view, are rather the *nouveau riche*. They turn up their noses very much at the gas industry. They make occasional polite references to us; but they are very much occupied in telling the public that we are done, and that there is not much further use for us. They almost go the length of saying that we ought to be prohibited, in order that we may have a completely electrical world. They are climbing all the time; and like social climbers in real life, they are trying to associate themselves with the best families. This is one of the things we have to put up with. I do not think, however, people quite realize that you cannot, by merely wishing it, dispose of a great industry like the gas industry. I am glad to say that, notwithstanding all these troubles and all these attacks upon us, we are in an exceedingly flourishing condition; and I believe that we have a great future before us.

INTERESTING PROBLEMS.

All sorts of problems are coming up for solution in this country; and you will notice that most of them are connected in one shape or another with the gas industry. Many people pin their faith to low-temperature carbonization. It is not my intention to give you a lecture now upon that subject; but at the same time I should like to say that there is in the gas industry a genuine desire to explore the question. For that purpose, as you know, the Gas Light and Coke Company are at the present moment erecting a unit of plant at their Richmond Works, where it is hoped thoroughly to test-out this matter. Among other problems there is the hydrogenation of coal. We really do not know exactly what may happen; but we do know that these great chemical processes which occupy the world at the moment are intimately connected with the gas industry, and we hope to play our part in the development of these national questions in the future. Mr. Clynes has mentioned our relationships with the men who work for us; and I am glad to say that they are of the happiest.

WHY OMIT THE GAS INDUSTRY FROM RATE RELIEF?

There is just one other matter I should like to mention—especially as we enjoy the privilege of having several politicians with us, and that is the question of the new proposals of the Chancellor of the Exchequer in connection with the relief of industry, particularly with regard to rates. It does seem to us in the gas industry essentially unfair that our industry should be left out in this matter. The proposal is to relieve all productive industries, including, I believe, the newspapers, tobacco trade, and artificial silk industry; but the gas industry is to be left out—and not only left out, but if any Imperial taxation should be necessary to pay for the remission of rates of these other "poor industries," we are among those who will have to find the means. We feel very strongly about that in the gas industry. It is a subject which we must go into more fully possibly in another place. At the same time, I do wish to emphasize our view of the matter now. If we get the relief which is being accorded these other industries, we shall be able to reduce the price of gas, and so help, not only the individual consumers, of whom there are millions throughout the country, but also the industries, many of which use gas as an absolutely essential part of their processes. We see no logic whatsoever in being deprived of this relief, if it is to be given to others. We are competitors in the market for coke and other things; and why relief should be given to our competitors and denied us, we fail entirely to see. It is a controversial subject, and so perhaps not a very fitting one for an occasion like this; but I felt it could not be passed over without mention.

Mr. Harold Talbot, B.Sc., A.R.C.Sc., M.I.Chem.E.

Mr. HAROLD TALBOT submitted "Our Guests," in place of Viscount Ednam, who was unable to attend. After mentioning a number of the guests by name, he said: I have reserved until last the guest whose name is coupled with the toast—Councillor Jacques Abady. I should like to mention two facts about Mr. Abady. One is that I think no member of his profession has done quite so much as he has done in his peculiar sphere of activity for the gas industry; and the other is that everybody who has knowledge of what occurred must admire him for the masterly way in which he tackled the immense problem which confronted the authorities of Westminster in connection with the disastrous floods. The Society of British Gas Industries, though relatively young in years as Lord Darling judges age, has played a most important part in the development of the gas industry, and is intimately concerned with one of the most vital problems of the nation. I refer to the fuel problem. In proposing the toast, I would express the hope that we may see our guests again.

Councillor Jacques Abady, Mayor of the City of Westminster.

Councillor JACQUES ABADY: It is a signal honour that you have done me in inviting me here and asking me to respond to this toast; and the occasion affords me particular gratification because I have been privileged to hear the wonderful oration with which Lord Darling has favoured us. His speech, if I may say so, was poetic, pathetic, and perfect in its vision. It voiced exactly the regretful sentiments that I feel that the beauties of life have perforce to give way to the utilitarian side of it. Perhaps I may be permitted to say here that I am perhaps the only one of the thirty or forty Counsel who have been before Lord Darling in connection with the Railways Road Powers Bill who has not opened his mouth during the course of the two or three weeks' proceedings. I am appearing in opposition to the powers which the railway companies seek; and having regard to the sentiments which Lord Darling has expressed here with regard to the roads, I shall feel every confidence in addressing him and asking him to throw out the proposals. [Laughter.] Reference has been made to the duty which was cast upon me as Mayor of Westminster in connection with the terrible floods. Alas, I understand that the only benefit I shall get from the weeks of anxiety and real hard work that fell to my lot in the performance of my duty is that I shall go down to posterity as the "floody Mayor." [Loud laughter.]

Mr. R. B. Hodgson, M.I.Mech.E.

Mr. R. B. HODGSON: We have been very disappointed at not having with us one of our Past-Presidents, Lord Ednam, who, as already mentioned, has been prevented from coming. I have also a telegram from Mr. H. D. Madden (President of The Institution of Gas Engineers) regretting his inability to be present. As Chairman of the Council, it is my privilege to propose the toast of "Our New President, the Marquess of Hartington." The Society all through its history has been fortunate in its choice of Presidents; and this year is no exception. We have had distinguished gentlemen, who have taken a lively interest in our work. Our Society is maintained to promote the very best interests of all connected with the contracting side of the gas industry; and we who are members are keenly interested in all that affects the progress of that great industry. The gas industry is one of the largest and most progressive industries in this country, and is consequently requiring plant, materials, and apparatus which we as a Society sell. Here are some of the many requirements to keep the works going: Coal in millions of tons, oil, cast and wrought iron pipes, gasholders, and carbonizing plant, gas fires and stoves, heating furnaces, millions of gas fittings, and a thousand other important things of use and interest to the economic production of gas. A highly interesting story could be told of the romance of the gas industry. I think, therefore, that our new President will find much to interest him as he comes among us. I can assure him his year of office will not be a very exacting one; but I trust it may be a very happy one, and that out of it he may receive much satisfaction and pleasure.

The Marquess of Hartington, M.P.

The MARQUESS OF HARTINGTON: I thank you most heartily for the extremely kind way in which you have received the toast, and can only hope that during my year of office I shall prove satisfactory to you.

NATURAL GAS.

Possibly many of you thought, when I referred this afternoon to the production of natural gas, that I was making a joke which you must have heard many times before about the production of gas in the Palace of Westminster; but I was alluding to the actual fact that the Company with which I am connected is, I believe, the only producer on a commercial scale of natural gas from deep borings in this country. It is at present, and is likely to remain for some time to come, on a very small scale indeed; and I think you are almost bound to hope that it may permanently be on a very small scale, because otherwise it might to a serious extent cut into your business. This natural gas is a wonderful commodity. No storage is necessary: Dame Nature sees to all that. There is no doubt that natural gas does exist in very large quantities in this country; and I personally feel little doubt that at some time its production will be increased to a considerable extent

THE GOVERNMENT PROPOSALS FOR INDUSTRIAL RELIEF.

Now, I would like, if I may, to refer for one moment to the remarks which have been made by Sir David Milne-Watson on the subject of the Budget proposals of this year. I think he has been somewhat ungrateful to Parliament for what it has done for him. He must remember that he enjoys—but perhaps that is not quite the word—that he has exemption from the changes proposed in this Budget for one reason, and for one reason only. That is, that the gas companies themselves are public utility undertakings. In other words, they have received, at some time or other in their history, the personal attention of a Committee of the House of Commons. Surely he cannot compare that inestimable privilege with considerations of "filthy lucre." [Laughter.] He has the Act by which he operates, and that is quite above rubies in price. But even so, the proposals will be of very great value indeed to the gas in-

dustry in other ways. As you know, the proposals include a very substantial remission of the railway rates on the carriage of coal. That will to most of you gentlemen mean a goodly reduction in the rates you have to pay. Those who are engaged in manufacturing the necessities for the production of gas should without doubt be able to make quite substantial reductions in the price of the things which they supply. I do venture to think that to the public utility side of the gas industry the proposals contained in this year's Budget will prove of great value.

The Society's Step Forward.

I should like, as a new-comer, to congratulate you most sincerely upon the great step forward which you have made this afternoon by the decision that you reached so quickly and so unanimously to put forth further efforts towards the solving of some of the problems which are confronting us at the present time. You have taxed yourselves to a very considerable extent; but you are doing the right and wise thing in extending the sphere of your activities in the direction of research. This work must be of great value, not only to the immediate group of interests with which you are connected, but to that vast industry which is of such vital importance to this country—the coal industry. A great deal of coal has been wasted in times past; and any effort that is made to improve the methods of utilization of coal must be beneficial not only to you, but to the whole nation. ["Hear, hear."] Much has already been done. The developments which have been made possible through your researches have not, as apparently hoped by Lord Darling, threatened the life of our coalfields, but have enormously extended it. A vast amount of coal which was hardly a commercial proposition until these discoveries were made is now of value. The life of our Derbyshire coalfield, which in 1913 was placed at 80 years, is now over 200 years, as the result of recent discoveries.

Capital and Labour.

One other reason why I am proud to be associated with this Society is because the industry of gas production which you serve has shown the way to a new and improved relationship between Capital and Labour. ["Hear, hear."] The great industry, which has done so much for the wellbeing of the English people, has so enormously increased the amenities of life for all classes in this country, has also led the way to better, happier, and saner relations between employer and employed. The gas industry has given a lesson in this respect which I hope other trades will be quick to learn. We have seen again and again since the war good trade spoiled and bad trade made far worse, by difficulties, disputes, bitterness, and jealousy between employers and employed. The gas industry has shown how all this can be overcome; and for that reason, also, I am glad to be your President. [Applause.]

EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

SPRING MEETING AT BEDFORD.

The programme of the Seventy-Fifth Half-Yearly Meeting of the Association was an extensive one. It included visits of inspection to the Bedford Gas-Works, to the Royal Airship Works at Cardington, and to the Luton Works of the Davis Gas Stove Company, Ltd. An interesting feature of the business meeting—the main item of which was the Presidential Address of Mr. J. B. Hansford, which will be found on p. 529 of this issue—was a presentation to Mr. W. H. Mainwaring, of Lincoln, who has acted as Hon. Secretary of the Association for seven years.

Bedford—the town of the President, Mr. J. B. Hansford—was chosen for the Spring Meeting of the Eastern Counties Gas Managers' Association, which took place on May 16 and 17. On the former day, members and guests assembled at the works of the Bedford District Gas Company, of which Mr. Hansford is Engineer and Manager, at 11.30 a.m., and commenced a tour of inspection of the works. In 1920 the output of the Company was 260 million c.ft.; the sales last year amounted to 370 millions. This rapid development has necessitated reconstruction of the plant, and the visitors were able to see how Mr. Hansford has brought the works thoroughly up to date, prior to hearing his account of "eight years' work," which formed the major portion of the Presidential Address delivered during the afternoon. One of the latest items of plant which attracted attention was an installation of Glover-West verticals; and inspection of this was made doubly interesting by a cinema film illustrating the construction and working of this system of gas-making plant, which was shown in the Social Clubroom on the works.

After the inspection, the visitors were conveyed to the Bedford Town Hall, where, at the invitation of the Chairman and Directors of the Bedford District Gas Company, they were entertained at luncheon. The Rev. P. Wyatt, M.A., J.P., the Chairman of the Company, presided.

LUNCHEON.

After the Loyal Toast had been honoured, on the proposition of the Chairman,

Competition Advantages.

Alderman W. Nicholls, J.P., said he felt highly honoured in being vested with the responsibility of proposing the toast of "The Eastern Counties Gas Managers' Association;" but before doing so he would like to extend to those present a most cordial welcome to the town of Bedford. They greatly appreciated the fact that the town had been selected as the meeting place of such an important body, for they well realized the part which the members were playing in local and national welfare. The Bedford Gas Company were certainly to be congratulated on their work; and though the Bedford Council had their own electricity undertaking, this in no way prevented them from esteeming and respecting the Engineer and Manager of what he might term the opposition undertaking—the Gas Company. As an Association, they must feel proud of their President, and the Bedford Gas Company, too, must feel proud of their Engineer, whose mind was undoubtedly centred on his profession, and who realized that he was serving his employers best by studying the interests of his consumers. Competition between gas and electricity in Bedford was friendly; and he (the speaker) thought that the rivalry was all to the good, for it served to brighten the homes in their locality, and to keep them up to date, in the most economical manner. From the national point of view, the gas industry was playing an important part. They fully realized that it was wasteful to burn coal in the raw state, and they looked to such bodies as the Eastern Counties Gas Managers' Association to solve the problem. Alderman Nicholls concluded by saying that it gave him much pleasure to couple with the toast the name of Mr. J. B. Hansford.

Mr. Hansford, on behalf of the Association, thanked Alderman Nicholls for the kind manner in which he had proposed the toast, and for his gracious welcome.

Helping the Community.

Mr. Thomas Glover, C.B.E., M.Inst.C.E., then rose to propose the health of "The Bedford Gas Company," coupled with the name of one of the Directors, Mr. G. C. Walker, J.P. He said how glad he was to find there was such an excellent relationship between those responsible for the government of the town of Bedford and Mr. Hansford. They of the Association respected their President very highly, and were more than glad to realize that his services were appreciated in Bedford. During the tour of inspection of the works of the Bedford Gas Company that morning, he had not heard a single word of unfriendly criticism. The works were extremely well planned, and plant had been adopted which would make the best use of the raw material—coal. As gas engineers, they were endeavouring to convert coal to the best account into gaseous therms, a valuable smokeless fuel, and valuable bye-products; and they claimed that the thermal efficiency of their process was higher than that of any other form of conversion of the energy of coal. They felt that by their work they were helping the community to a better life, by ridding the atmosphere of smoke and the household of drudgery. They were, in fact, endeavouring to build a Jerusalem in England's green and pleasant lands. They wanted their cities to be centres of life, and to possess amenities which would draw people to them. With regard to the gas-works they had inspected, there was a very great difference between them and the inefficient works of the past.

Then and Now.

Mr. Walker, responding to the toast, remarked that it was in 1833 that the gas company was promoted by twenty-four Bedford townsmen, for "the manufacture of inflammable air." At that time gas meters were not easily obtainable, and even when consumers had them fixed they had to pay 15s. per 1000 c.ft. of gas consumed. The normal practice was to supply gas at a fixed charge per burner. An annual charge of £6 8s. was made for the use of a flat-flame burner when it was in use from dusk to midnight. If it was in operation throughout the night, the charge was then £10 10s. Thus they could well understand that if a consumer had two or three burners, his gas bill would have been somewhat heavy. From 1833 and up till 1863, the gas consumption in Bedford was under 2 million c.ft. per annum, and in the latter year there were only about 330 consumers. At the present time there were 11,300 consumers, and the gas sales amounted to nearly 400 million c.ft. a year. In 1863 the gross revenue of the undertaking was under £5000 per annum; to-day the corresponding figure was over £100,000. Having outlined the general developments of the works, Mr. Walker mentioned that if any of the Directors of the Company who visited the plant fifteen years ago had not visited them again until that day, they would have been amazed at the remarkable progress. Most of this progress, he continued, had been due to the advice of Mr. Hansford, whose sound counsel was always accepted by the Directors. Their Chairman, Mr. Wyatt, had been a Director of the Company for thirty-nine years, and his experience was invaluable. The Directors of the Bedford Gas Company felt that the Eastern Counties Gas Managers' Association, in electing Mr. Hansford as their President, had honoured not only Mr. Hansford, but also the Company.

Mr. W. W. Townsend, of Colchester, in proposing the "Town and Trade of Bedford," remarked that it was a great pleasure for the Association to visit the various towns in which their Presidents

were responsible for the gas supply; and he would say that no town they had visited was more charming than Bedford, which in a few days would be celebrating the tercentenary of the birth of John Bunyan. Nor was Bunyan the only celebrated personage of Bedford, for there was John Howard, the famous philanthropist, and a Lord Mayor of London in the sixteenth century who was responsible for the foundation of the Bedford Schools. Education was fostered in Bedford, and it was refreshing to realize that learning was still honoured in the town, which was certainly well managed to-day by an up-to-date municipality. Having referred to the industrial activities of Bedford, Mr. Townsend coupled with the toast the name of Alderman G. H. Barford, J.P., the Deputy Mayor.

Alderman BARFORD, in the course of his reply, spoke of the healthy competition between gas and electricity in Bedford—competition which, he suggested, helped towards the efficient working of each. The town was to be congratulated on having two such well equipped and managed undertakings for the distribution of light, heat, and power.

The final toast—that of "The Visitors"—was proposed by Major A. W. H. LEES, Deputy Chairman of the Bedford Gas Company, and responded to by Mr. S. R. WELLS, M.P.

Following luncheon, the members adjourned to the Shire Hall, where the business meeting was held. While this was in progress, the Rev. P. Wyatt conducted the ladies of the party on a motor tour to the village of Elstow, the birthplace of John Bunyan, and to Cardington, which was the home of John Howard, the prison reformer and philanthropist.

BUSINESS MEETING.

The minutes of the last general meeting having been taken as read,

PRESENTATION TO MR. MAINWARING.

The PRESIDENT said he had great pleasure in asking Mr. W. H. Mainwaring, of Lincoln, to accept a testimonial, and gifts consisting of a chiming timepiece and a rose bowl, as a mark of appreciation of his valuable services as Hon. Secretary of the Association for seven years. The testimonial was signed by the six gentlemen who had occupied the chair during Mr. Mainwaring's tenure of office—namely, Messrs. E. F. Keable (Gorleston), H. G. Ruggles (Leighton Buzzard), J. H. Troughton (Newmarket), A. W. Sumner (Grays and Tilbury), and F. Prentice (Ipswich), and himself (Mr. Hansford). Unfortunately Mr. Prentice was unable to be with them that afternoon, but he had sent a letter in which he said: May I say a word about our friend Mainwaring, who as Hon. Secretary of the Association has served us so well for so many years. Not to be able to take personal part in the proposed presentation is a source of regret to me; and I shall be grateful if you will convey this expression to him, and also to members generally.

Mr. KEABLE remarked that he had known Mr. Mainwaring for many years, and from all standpoints their former Hon. Secretary was to be admired. The Association were under a deep debt of gratitude to him for his tact and painstaking services. In regard to the presentation, Mr. Keable said that he had received nearly a hundred letters in which appreciation was expressed of Mr. Mainwaring's work. The essence of the correspondence could be stated simply as "Well done, thou good and faithful servant."

Mr. RUGGLES, Mr. TROUGHTON, and Mr. SUMNER also expressed their own and the Association's appreciation of Mr. Mainwaring's services.

The PRESIDENT then formally made the presentation.

In reply, Mr. MAINWARING said how grateful he was to the Association for their idea of a combined testimonial, and assured them that it had been a great pleasure to do whatever he might have accomplished.

The President read the names of new members and associate members, as follows:

Members.—Messrs. A. R. Jubb (Melton Mowbray), T. Worthington (Halesworth), and B. Clarke (Stamford).

Associate Members.—Dr. J. G. Stewart (Sigma Instrument Company, Ltd.), and E. W. Bonsey (British Gas Light Company).

The HON. SECRETARY, referring to the gift of £50 by Mr. W. Jones, of Felixstowe, which had been mentioned at their last meeting, said that the Council had come to the decision that it would be preferable for the money to remain as a fund to be directly administered by themselves in their own district—a plan with which the donor was in entire agreement.

EDUCATION SCHEME.

The PRESIDENT then called upon Mr. Keable to report on the Education Scheme of The Institution of Gas Engineers.

The HON. SECRETARY explained that the Committee formed last September at Cambridge had met three times. Mr. Frank Prentice, of Ipswich, had been unanimously elected Chairman, and he (Mr. Keable) had been appointed the representative of the District on the Gas Education Committee, London; Mr. E. W. Smith, of Chelmsford, acting as Deputy. Mr. Keable went on to say that the area covered Lincolnshire, Suffolk, Cambridgeshire, Huntingdon, Rutland, and portions of Nottinghamshire, Northamptonshire, Leicestershire, Bedfordshire, Essex, and Hertfordshire. With the aid of Mr. S. O. Peet, the Board of Education representative on their Committee, they had obtained and classified the whole of the educational establishments in the area, with a schedule of available facilities. At present there was no recognized centre available for the internal study of either gas engineering or gas supply. With a view to testing the possible number of students in their district, they sent out a circular letter in January last explaining in outline the Institution Scheme, and as a result there was a reasonable hope that at least gasfitting classes might be formed and recognized under the Scheme in the following places: Mansfield, Cambridge, Norwich, Ipswich, Colchester with Harwich, and Great Yarmouth, in which it was hoped to gather in about eighty students. They were pleased to find that good work in this direction had been going on at Cambridge, Norwich, and Ipswich. They were at present engaged in exploring the possibilities of getting a start in the early autumn, with the help of the Board of Education representative and the Superintendent of Technology of the City and Guilds of London Institute. They would realize that the eighty students to which he had referred were of all ages from (say) sixteen to over forty; and this fact offered several problems which they were doing their best to overcome. The work was new. It covered a wide area; and they would, he was sure, appreciate that it would take time to make much show. They did, however, assure them that their best endeavours were being, and would be, made in the interests of students; but obviously if they were to succeed ultimately in their task, there must first be a keen desire on the part of the students to acquire extended knowledge, even to the point of personal sacrifice. As a bridge to their best endeavours, the Committee asked employers to render students every reasonable facility to pursue their studies, by granting either time off or financial assistance in some form. As their representative on the London Committee, Mr. Keable said that he had attended four meetings, and from first-hand observation wished to assure students that every case dealt with received the most minute care. The Scheme had come to stay. The industry needed the best trained men; and he was sure that the Eastern Counties would give of their utmost.

Mr. J. W. AUCHTERLONIE, of Cambridge, proposing the adoption of the report, remarked that it was a good thing for the Association to have a Committee dealing with this work, and their efforts deserved every encouragement. He referred to the progress which was being made in Cambridge in regard to the training of students under the Scheme.

The HON. SECRETARY mentioned that, up to a week ago, it was understood that the Association would have to bear the expenses incurred by the Committee, but the Committee of The Institution of Gas Engineers had now informed them that they would be prepared to defray the expenses of printing, &c., to the extent of £10 per annum. Consequently the Scheme would not be a charge on local funds.

Mr. A. GREGORY seconded the report, and it was adopted.

Mr. J. H. TROUGHTON moved the adoption of the Committee's report and balance-sheet for the year 1927. Never, he said, had a more successful report been issued than that relating to the last twelve months.

Mr. WHIMHURST, of Bury St. Edmunds, seconded the adoption of the report.

The PRESIDENT's proposition that £5 5s. should be contributed to the Benevolent Fund of The Institution of Gas Engineers was carried *nem. con.*

MR. J. B. HANSFORD'S PRESIDENTIAL ADDRESS.

At this stage in the proceedings, Mr. HANSFORD delivered his Presidential Address, which will be found on p. 529 of this issue.

Mr. H. C. SMITH, of Tottenham, in proposing a vote of thanks to Mr. Hansford for his excellent address, remarked that it appeared to be the view of their President that it was better to supply gas appliances at low rental, and fix these appliances either at small charge or at no charge at all, rather than to burden the consumer with the actual cost. He (Mr. Smith) disagreed with this view, for he could not see why the consumer should not bear the fair cost of the apparatus and of their installation. It was better to charge the consumer at once with the cost of this work, rather than to make him pay afterwards in an additional cost for gas consumed. Before the war he decided to fix appliances free, and as a result of this policy the fixing business increased rapidly. The sales of gas, however, did not increase in like ratio; and it was soon discovered that many of the appliances that had been fixed were not being used by the consumers. Consequently the system of free installation had been discontinued, and now consumers who had apparatus fitted could be relied upon to use them. Mr. Smith then referred to Mr. Hansford's remarks on the Royal Charter of The Institution of Gas Engineers, and his query "Why limit it to 'Town Gas.'" The whole thing, said Mr. Smith, was based on the definition of the gas industry; and those present at the meeting of the Institution when the matter was discussed received the proposals most favourably. Later on in his address, the President had mentioned the means he had adopted to reduce the percentage of unaccounted-for gas, but he had not told them to what figure it had been reduced.

The PRESIDENT: It has been lowered to 5 p.ct.

Mr. SMITH, continuing, asked whether Mr. Hansford had

done anything in regard to consumers' meters. Four or five years ago he (the speaker) came to the conclusion that 3-light meters were not adequate to measure the gas taken by consumers who used (say) 45,000 c.ft. per annum. He had come across 3-light meters in houses where there were fires and a geyser, in addition to lighting; and he decided to scrap all the 3-light meters on his district. He was carrying this out at the rate of eight or nine thousand a year, and the plan was resulting in a decrease in the amount of unaccounted-for gas.

The President: That is my experience, too.

Mr. W. W. Townsend, of Colchester, seconded the vote of thanks, saying that the address to which they had just listened was an original, a courageous, and a thoughtful one. The Association had certainly done well in paying a visit to Bedford. When they were inspecting the gas-works that morning, a remark he had heard several times was, "How excellent it is to have such an amount of room. Well, said Mr. Townsend, this was not a mere accident, but the result of good planning and design on the part of their President, as study of the two plans included in the address would enable them to appreciate. With regard to distribution, he was rather sorry that Mr. Hansford had not given a block plan of his mains system. There was no one method of solving distribution problems, and it would have been interesting to hear more about Mr. Hansford's scheme, which had been formulated for years ahead. He was glad to notice what reliance their President placed on scientific control. For instance, the steam meter and recorder in connection with the steam used for the vertical retorts was well worth noting. Concluding his remarks, Mr. Townsend asked whether Mr. Hansford extracted naphthalene from the gas.

The President said the reason why he had not told them more about his distribution scheme was that he did not wish to burden his address with a lot of technical details. The chief idea was to run a 20-in. main round the town, and feed in towards the centre.

Mr. Townsend: Will this main be high-pressure or low-pressure?

The President said that it would be a low-pressure one. At present, he went on to say, streets of from two to three hundred houses, three miles from the works, were fed by a 3-in. main. Last Easter Sunday they had pulled out seven or eight hundred yards of 3-in. main, half choked up with rust, in the main street of Bedford, and they had replaced it with 6-in. main. They had reconnected the services, made good the footways, and finished off the whole job by the Monday night. With regard to Mr. Smith's remarks on charges for appliance fixing, this, he suggested, was a matter dependent wholly on local conditions. In reply to Mr. Townsend, there was no naphthalene in the gas at the outlet of the scrubbers.

Place of Next Meeting.

The President suggested that the autumn meeting of the Association should be held in London; and this met with general approval.

Dinner and Reception and Dance.

In the evening, members and their ladies dined together at the Town Hall; Mr. J. B. Hansford taking the chair at seven o'clock. This was followed by a reception and dance, given by the President and Mrs. Hansford, at the Corn Exchange, Bedford. At the former function, Mr. Frank Prentice was presented with the President's Medal. As for the dance, the dance floor at the Corn Exchange is one of the finest in the Provinces. It was a brilliant scene that confronted the guests, who numbered about 150, for the hall was most artistically decorated. The Company included many of Bedford's most distinguished citizens. Mr. R. J. Milbourne acted as Master of Ceremonies, and carried out his duties in admirable fashion. Departing from the conventional present-day dance programme, he interspersed with the "Yale Blues" and the "Fox Trot" the "Lancers" and other old-time graceful dances. A delightful atmosphere of cordiality and merriment prevailed throughout the evening. The dance was a fitting conclusion to a memorable day's proceedings.

Visit to the Royal Airship Works at Cardington.

On Thursday, May 17, at ten o'clock, members and their ladies departed from Bedford for a visit to the Royal Airship Works at Cardington, by permission of the Secretary to the Air Ministry, to inspect the 5 million c.ft. giant airship now in course of construction, for service between this country and India. As the production of hydrogen for filling the airship now in course of construction will be carried out on the premises, a description will probably be interesting. The process of hydrogen manufacture carried out at Cardington is known as the "steel and iron contact system," and consists primarily of a retort bench containing iron vertical retorts filled with spathic ore. The retorts are heated by radiant heat derived from the control system of water gas burners suitably arranged in the benches; the hydrogen being produced as follows: The bench is first of all heated to a temperature which causes the spathic iron ore to become molten, so that when water gas is passed through the ore the oxygen is taken up by the water gas and returned to the water gas generator for revivification, leaving the ore in a suitable condition for the next process. Steam is then passed through the retorts, and is split up into its component parts of hydrogen and oxygen by the heated ore; the oxygen combining with the spathic ore and allowing the hydrogen to pass forward to the scrubber, where it is boosted through the purifiers and on to the holder, and is then ready for the filling of airships.

In order to meet the larger demand for hydrogen required by the increased capacity of the modern airship, the former hydrogen plant at Cardington has been dismantled, and is being reconstructed; the old retorts being superseded by an improved patented type of retort and system of revivification of the spent gases which enables double the output of hydrogen to be obtained from the same size bench, in addition to more perfect control of the working. The reconstruction is being carried out by Messrs. R. & J. Dempster, Ltd., of Manchester, who have the sole right for the new patented retort.

The hydrogen plant will be in two units so arranged that each unit can be worked independently of the other. Each unit consists of a water gas producing plant, a gasholder and booster, and a hydrogen bench containing a series of retorts filled with calcined spathic ore, together with a hydrogen scrubber, a booster, purifiers, and a holder. Each of the benches will produce 8000 c.ft. of hydrogen per hour.

The Luton Works of the Davis Gas Stove Company, Ltd.

A drive through some of the best scenery in Bedfordshire, including Woburn Park, the seat of His Grace the Duke of Bedford, brought the visitors to the Luton Works of the Davis Gas Stove Company, Ltd., where they were received by Mr. Harold N. and Mr. Cyril G. Davis, Managing Directors of the Company, and entertained at luncheon.

The President voiced the thanks of the Association to Mr. Harold and Mr. Cyril Davis for their kindness and hospitality.

Mr. Frank Prentice, in supporting the vote of thanks, remarked that he had great pleasure in doing so, for many reasons. In the first place the Association owed Messrs. Davis their thanks for their hospitality and for their promised instruction in regard to the manufacture of gas appliances. But he suggested that they, as gas engineers, owed the firm a far greater debt of gratitude than this. There was a slogan to the effect that dividends were made in the retort house. As a matter of fact, it could with equal wisdom be stated that dividends were made by the distribution system. Without efficient apparatus in which to consume the gas made and distributed, however, no profit would be made. In the early days they tried to make gas stoves in Ipswich, but these stoves gave out little heat compared with the amount of gas they consumed. The Davis Gas Stove Company, from their early days, had brought skill, ingenuity, and ability to bear on the problem; and it was certain that without their aid the gas industry would not have been in the position it was to-day. It was for this reason that they owed the firm such deep gratitude.

Mr. Cyril Davis, replying to the vote of thanks, said he thought that this was the only senior Gas Association who had visited the works. It was most appropriate that the Eastern Counties Association should be the first to inspect the works, for it was in the Eastern Counties that the business of the firm was really started.

Mr. Harold Davis, also responding, characterized the firm as being "triers," and said he was grateful for the remarks which indicated that they knew their business. Some people had the idea that anybody could make gas heating or cooking apparatus, but he contended that a gas stove was a scientific appliance, which their firm claimed to produce in a commercial way.

For the occasion the Davis Gas Stove Company had prepared a most artistic brochure giving particulars of the Luton Works; and it is from this booklet that the following description is extracted.

The works of the Davis Gas Stove Company and its subsidiary concerns—the Davis Furnace Company, the Diamond Foundry Company, the Diamond Enamel Company, the Nautilus Fire Company, and the Nautilus Company—occupy sixteen acres. They have been steadily increasing in size year by year as the business has expanded, and an additional thirty acres, which have been secured for further extensions, will become fully occupied as time goes on.

The works are planned and equipped on the most efficient lines. To save labour in the handling of the goods, the works have been built in the shape of a horse-shoe. At one end is an inward, and at the other an outward, railway siding. Pig iron and other raw material are brought in at the one end, conveyed from one department to the next as they are subjected to the different processes of manufacture, and eventually emerge at the other end in the form of finished articles ready to be transported to any and every part of the British Isles, and abroad.

Foundry Departments.

The foundry or moulding shop, it is claimed, is one of the largest engaged in the production of light castings in the country. It covers a floor area of about 3½ acres. The visitors first passed through the pattern shop and the pattern store, where

many thousands of patterns are kept and classified, so that any one can be quickly located when needed.

The tour proper commenced at the inward siding, so that the visitors could see how ingenious planning has made possible a continuously progressive course from the arrival of the raw material to the dispatch of the finished article. The raw material coming in on the inwards siding is deposited near two cupolas, which supply the foundry. Each of these cupolas is capable of melting seventy tons of metal a day. From them, in bogies suspended by an overhead runway, the molten metal is conveyed to 340 moulders.

In the sand shop, adjacent to the cupolas, is a sand-mixing plant of the most modern type, in which the sand is prepared for the use of the foundry. For the production of castings of really fine quality, careful and correct treatment of moulding sand is very necessary.

In the core shop adjoining the moulding shop are made the cores used in the moulding of hollow castings, such as burners and radiator columns.

Castings are conveyed from the foundry into the dressing shop for cleaning. This department was completely reorganized last year, and is now one of the finest in the country.

The main drive is underground, so that the belts are kept away from the operatives. All the machinery is " exhausted " to carry away the light dust which, usually contaminating the atmosphere of dressing shops, is so bad for the health and comfort of the workers. Castings are cleaned sometimes by sand-blasting, sometimes by rumbling, according to their nature.

In the passing shop the castings are subjected to a rigorous inspection. All tap-rail castings are tested under pressure; and any castings in which defects are discovered are rejected and scrapped.

The passing shop is the last department of this side of the works, which bears the general name of foundry department; and from there the castings are distributed to the various warehouses or to other departments for further treatment.

Tool Room and Finishing and Assembling Departments.

The tool room is equipped for the making of the jigs, gauges, and press tools so necessary in modern methods of production in large quantities. The machine shop is fitted with the most modern plant for the machining of castings. Passing from the machine shop along the extensive castings warehouse, the visitors next came to the grinding mill, where the castings are given the high polish necessary for good finish.

The japanning department, where japanning or stove-enamelling is done, is about to be completely reconstructed and enlarged. There is no little electro-plating needed in connection with Davis productions. In particular there is the " Crystal " gas iron.

In the gas stove assembling department the various parts of the well-known productions of the Davis Company are assembled. The fitters handling the higher-grade appliances are exceptionally skilled at the work, and most of them have reached their present high stage of efficiency by passing step by step from one class to another in the shops of the Company's works.

Clearly there are some classes of apparatus that do not need such highly skilled handling. Juniors are engaged on such work, but are closely supervised. " Only the best is good enough " is impressed on them; and gradually they are trained up to the high standard required by the Company.

In the testing shop the completed stoves are subjected to the closest examination, and the gas consumption of every burner is carefully tested by scientific methods.

Dispatch and Transport.

In the dispatch warehouse the fitted stoves are stored, ready to be finally blacked or otherwise " finished " as required, and equipped with the necessary accessories. Finally the shipping department dispatch the goods, either by loading them into wagons on the outwards siding adjacent to the dispatch warehouse, or on to lorries for delivery by road. This latter method of transport, though more costly than the rail, is now largely employed by the Davis Gas Stove Company in pursuance of their fixed policy of service—of studying their customers' interests and convenience first.

Sheet Metal and Enamelling Departments.

These departments, too, are so arranged as to reduce handling to the minimum. Supplies are unloaded from the wagons on the inwards siding direct into the sheet metal stores. From here they are issued straight to the pressing and stamping shops, sheet iron department, or geyser department, as required.

The press shop is equipped with presses and guillotines of various sizes necessary for the economical production of sheet metal plates, oven shelves, and the like. In the sheet iron shop the plates are folded and finished, and then inspected before being passed across for enamelling or for stove-blacking. Here also many thousands of oven grids and plate-rack grids are made; a large number of lads being employed on this work alone.

To bring Davis geysers to their present high stage of efficiency, considerable research, experiment, and specialized skill were needed in the geyser department. The wide and increasing popularity of the Davis " Rose," " Shamrock," " Clover," " Tulip," and " Thistle " geysers is the gratifying result. And the new " art " finishes which can now be applied to them are making Davis geysers greater favourites than ever.

Davis porcelain enamel has always been celebrated alike for its good finish and its exceptionally durable qualities. The vogue for gas cookers encased in white enamelled steel plate has been the cause of a series of extensions in the porcelain enamelling department, and at the present time five large muffles are in operation, day and night, to cope with the demand.

Recently, after a great deal of research and experiment, a new process has been elaborated for successfully enamelling cast iron. The " all-enamelled " gas cookers—the " Alpine-New-World " and other Davis patterns—are the most notable outcome.

" Nautilus " Products.

In the range fitting department are fitted " Gascol " ranges, " Nautilus " grates, and portable and other solid-fuel stoves, and the " Nautilus " coke boiler. The works of the Nautilus Company, though on the same ground as, and adjacent to, the main works, are self-contained. The chief building is devoted to the production of high-class joinery-work for panelling, staircases, and the like, chiefly for the fitting up of gas companies' showrooms. In this work the Nautilus Company have a wide experience.

Subsidiary buildings are devoted to the manufacture of " Nautilus Economy " gas flues and " Rubston " fireplaces. " Nautilus Economy " gas flues are used in their thousands in buildings of all sizes and descriptions. They do away with chimney-breasts and large brick stacks, and save substantial sums in building costs.

Research Laboratories.

The well-equipped chemical and physical laboratories, in which raw materials are analyzed and tested, interested and impressed the visitors. Here, as well as at the Central Laboratories at Radiation House, London, new apparatus is continually being developed.

Recreation and Social Amenities.

Employees of the Davis Gas Stove Company and the associated companies have extensive facilities for many kinds of indoor and outdoor recreation. The Davis Athletic and Social Club, which is controlled by a Committee of employees elected by the members, has two billiard tables, as well as the necessary gear for other indoor games. The spacious and well-lighted canteen is used on occasion for dances and concerts.

As to outdoor games, the Davis employees were virtually the pioneers of bowls in the Luton district. Two hard courts are extensively used by tennis enthusiasts, and about a mile from the works is a ten-acre sports ground for cricket and football.

Following the tour of inspection, the visitors were entertained at tea by Messrs. Davis. Mr. W. W. TOWNSEND, of Colchester, took the opportunity of expressing the thanks of all who had taken part in the visit for the excellent arrangements which had been made for their comfort, and for the kindness and patience which had been exhibited by the guides. Everyone must have been greatly impressed, he observed, by the efficiency of the organization.

A brief reply by Mr. CYRIL DAVIS concluded a meeting which from start to finish was an undoubted success.

Charter Centenary of the Civils.

The Institution of Gas Engineers, which has just deposited with the Privy Council its Petition to the King for the granting of a Royal Charter, is to be represented by its President and Hon. Secretary at the celebration of the centenary of the granting of its Royal Charter to the Institution of Civil Engineers. The programme opens on Sunday, June 3, with a service in Westminster Abbey. The reception of the British and foreign delegates takes place on the following day; and a conversazione will be held at the house of the Institution on Tuesday, June 5. An engineering conference on June 5 and 7 will be a feature of the centenary celebrations. In connection with this conference, on Tuesday, June 5, the following subjects, among others, will be introduced for discussion: " Utilization of Solid and Liquid Fuels," by Dr. C. H. Lander; " Coke Oven, Town, and Producer Gas," by Mr. Robert Ray; and " Waterless Gasholders," by Mr. Frank Prentice, of Ipswich. Among the visits to works is one to the works of the Wandsworth, Wimbledon, and Epsom District Gas Company, on June 7. Meetings of the conference for the discussion of engineering subjects are open to members of other engineering societies, who may obtain cards of admission on application to the Secretary of the Institution of Civil Engineers. The visits to the engineering works, however, are confined to members of the Institution.

SOUTHERN ASSOCIATION VISIT ROCHESTER.

A Successful Meeting of Varied Interest.

The President of the Southern Association of Gas Engineers and Managers, Mr. C. Valon Bennett, who is General Manager, Engineer, and Secretary of the Rochester, Chatham, and Gillingham Gas Company, was "at home" to the members on Friday last, when a very large number, on the invitation of the Chairman and Directors of the Company, took part in a programme of varied interest. Possibly it would be true, in reference to the attendance, to make use of a word which has so often to be requisitioned when speaking of matters relating to the gas industry, and say that it was a "record." The visitors had been promised a warm welcome, and they received it. In his Presidential Address, delivered last March, Mr. Valon Bennett had indicated that there were a number of interesting features on his works. Even so, there can be no questioning the fact that the gathering constituted a high compliment both to the President and to his Board.

At the Rochester Works.

Those members who travelled down by rail were met at one or other of the stations by conveyances, and straightway taken to the Rochester Works of the Company, where all assembled and were welcomed by the President and his Chairman (Alderman E. W. Willis, J.P.). They then proceeded to an inspection of the works, during which portion of the proceedings the President was assisted by the following members of his staff: Messrs. A. W. Gray, P. Pickering, Wright, Attwool, and Metcalfe. One of the many evidences of kind thoughtfulness which the day produced was the provision of a marquee, in which light refreshments were served.

The weather was permitted to interfere as little as possible with the day's enjoyment; but it must be admitted that gasworks are not, in a drenching rain, seen at their best. Fortunately this state of affairs soon passed away, and before the members left the works they were able to see them under the fine-weather conditions which prevailed during the remainder of the visit. They were then able to appreciate to the full the cleanliness, orderliness, and good condition of the plant—which we were assured by the President, in response to a chaffing remark—had not been subjected to anything in the nature of a special "wash and brush up" for the occasion. The roominess of the site and the excellence of the lay-out were also freely commented upon.

For an illustrated description of the Rochester Works, readers are referred to the Presidential Address to which allusion has already been made. It is there pointed out that until 1925 the carbonizing plant consisted of nine beds of eight retorts, each 20 ft. long, machine stoked and heated by regenerators. These were demolished, and within the same building it is possible to produce 80 p.ct. more gas by the erection of nine beds of ten retorts, each 22 ft. long. These are Ω-shaped, and are 24 in. by 18 in. in section. They are constructed of silica sections, and are charged and discharged by a De Brouwer machine; the coke being removed to the yard or the C.W.G. plant, as desired, by a De Brouwer conveyor.

In 1922 two sets of C.W.G. plant were erected in a disused retort house. Each of these, fitted with a waste-heat boiler, can produce 1,250,000 c.ft. per diem. There is sufficient room within the building for one more plant of similar size, whenever necessity calls for its erection. The coke for these plants is supplied from an overhead bunker, which is fed by the coke conveyor previously referred to. For some years, blast product purifiers were employed for catching the dust when the stack valves were opened. As these were not entirely satisfactory, and were very expensive to maintain—to say nothing of the cost of pumping the necessary water—"Centriflovane" grit catchers were installed in 1927, and after minor alterations have proved extremely efficient. New wet purification plant in the form of Livesey washers and Holmes rotary scrubber-washers fitted with Noden buckets has proved itself efficient. All engines and machinery have been centralized in one new building; the purifiers have been converted to the luteless type; and, lastly, the gas, before entering the holders, passes through a new station meter of the usual design, which apparatus will deal with 150,000 c.ft. per hour. The holder capacity of this station is only 1 million c.ft.; but it has been possible to postpone the provision of more storage by installing turbo-boosters, so as to provide at all times whatever pressure may be required at the station governors, notwithstanding the fact that the holders may be only partially inflated.

Luncheon.

The inspection concluded, the members were conveyed to the Town Hall, Chatham, in the beautiful council chamber of which they were the guests at luncheon of the Chairman and Directors of the Gas Company. Including some prominent local gentlemen who had been invited to meet them, those who sat down numbered about 170. Alderman Willis was in the chair; and he was supported in the vice-chairs by the other Directors—Mr. E. H. Elliott (Deputy-Chairman), Major I. Granville Winch, Mr. Beckford Ball, and Mr. Robert Cobb. The Mayor of Rochester and the Mayor of Gillingham were among those present; but unfortunately the Mayor of Chatham was absent, consequent upon having undergone a serious operation.

The Chairman, after he had submitted the toast of "The King," proposed "The Southern Association of Gas Engineers and Managers." He told the members how delighted he and his fellow members were to see them, and said they felt that the visitors had come in such large numbers out of compliment to the President—to show their appreciation of him and their respect for him. ["Hear, hear."] He could assure them that these sentiments were shared by the Board of the Company, the staff, and also the workmen. This was an important factor in the success of the undertaking.

Early Days of the Company.

It might interest them to know that the Company was formed in 1818, with a capital of £12,000. In 1918 it was impossible, in consequence of the war, to celebrate in any way their centenary; but in 1924 their President was good enough to edit and circulate among those interested in the Company a valuable brochure, the first part of which was devoted to the early history of the Company. From this it appeared that gas was first supplied to Rochester and Chatham in the year 1819, when, in submitting the terms and conditions upon which gas would be supplied, the Directors issued the following announcement: "They wish to impress the necessity of a compliance with their regulations, more particularly respecting the height of the flame and the time of burning, a negligence in which subjects the Company to serious loss by an improvident and excessive consumption of gas, deprives their neighbours of a fair proportion, and will ultimately injure themselves in the destruction of burners, glasses, &c.—without that equal and steady light which gas is so peculiarly calculated to produce." He believed, as a matter of fact, inspectors went round, and if the gas was too high they simply walked in and turned it down. The charges at that time were, of course, per burner, used during specified hours. The first public street lamps lighted by gas in 1824 were situated in Minor Canon Row, Rochester. The first record of gas being sold by meter was to St. John's Church, Chatham, in 1829; the charge then being 15s. per 1000 c.ft. The second part of the brochure was devoted to a description, as they were in 1924, of the Company's works, one of which members had seen that day. He thought they should "take off their hats" to the pioneers of the gas industry, because they laid the foundations upon which their successors had been building ever since. The people who put down their money in the very early days had certainly the courage of their convictions; and their pluck deserved every acknowledgment.

No Finality.

There was no finality to the gas industry. Doubtless the greatest stride that was ever made in gas lighting was the invention of the incandescent burner. He thought there was nothing connected with the gas industry that had given him more pleasure and more annoyance than that particular form of illumination. He went over Rochester Bridge, and saw the beautiful high-pressure gas lighting there. Then he would go down a street and find splendid lights outside shops and business premises, and think to himself what an excellent advertisement this was for the gas industry; but on turning a corner he would see through a window a mantle that had "shot its bolt," and the owner of which, rather than spend a few pence on replacing it, would put up with this wretched illumination. He sincerely hoped that the labours of the Association in the future would be as fruitful as they had been in the past.

The President's Acknowledgment.

The President, responding, thanked the Chairman for the generous manner in which he had proposed the toast. "May I," he remarked, "say how much I appreciate the kindness, sympathy, and assistance of you and your colleagues on the Board, not only to-day, but in all other matters appertaining to my Presidency." This was the first occasion upon which they as an Association had visited that area; and he was sure they would long remember it. These visits to works were of inestimable value to all who took part in them. They broadened the knowledge of members, and enabled them to get to know one another more intimately; and of this the undertakings and the communities they served reaped the benefit. The enthusiasm shown by the Directors of this and other companies in connection with Association matters was a source of inspiration to them; for without the blessing of Directors, they felt that the Association could not have attained the high position in the gas industry which it held. The work of any public utility undertaking was essentially of vast service to the community; and recognizing this, the members appreciated the broadmindedness of the Board in asking to join them that day the representatives of the electrical industry, who, though they were friendly rivals, were bent upon service, which was of such importance that he need not further dwell upon it.

The Southern Association.

The Southern Association, founded in 1875, was the largest Gas Association in the country, excluding The Institution of Gas Engineers; and even at the risk of saying something which might be misunderstood by members of the other District Associations, he claimed that it was not only the largest, but the best. He had been wanting to say this for a long time; for he was a strong believer in having "a good conceit of oneself." And now, having made this statement, he expected to be assailed from all quarters for his audacity; but to his critics he would say: "Just look around, and you will find that the seeds of most of the national organizations connected with the industry were sown by the Southern Association; and although some of the members remove to parts of the country outside

our area; we are proud to think they never resign their membership." If asked to define their area, he was afraid he could not give an adequate reply; but when he said they had members as far north as Leeds, as far west as Cornwall, and as far east as Ramsgate, it would be appreciated that their sphere was practically unlimited. It was the intention of the members to uphold the dignity of the Association, and to continue in the work upon which they were daily engaged, of providing such service to the nation as was essential if this country was to maintain its position within the greatest Empire the world had ever known.

THE LOCAL AUTHORITIES.

Mr. W. M. MASON (in the regretted absence of Mr. F. W. Goodenough, C.B.E.) proposed the toast of "The Local Authorities." It was, he said, always a pleasure to attend these district meetings, which were productive of so much good. He believed the history of the ancient borough in which they were assembled stretched back in English history over 2000 years; but he must confess that, in going round and visiting what they had of this wonderful old city, what he had seen mentally were not its ancient glories, including the beautiful cathedral, but rather the ghost of one of the greatest Englishmen in literature, Charles Dickens. Chatham was, of course, also closely bound up with what they all believed, and rightly so, to be the greatest navy in the world.

Mr. F. C. A. MATTHEWS (Mayor of Rochester), who replied on behalf of the Mayor of Chatham, remarked that in a year's time their Chairman of that day would complete fifty years on the Rochester Corporation. [Applause.] In Rochester and the surrounding towns they were served by a wonderfully efficient Gas Company. They enjoyed an unlimited supply of gas during the coal stoppage; and, further, in January, when the works were 5 ft. or 6 ft. under water, the supply of gas was still unrestricted. He wished to say publicly: "We thank you, Sir, and we thank the Directors and the staff, for having given us this unlimited supply." The Rochester Gas Company were blessed with a remarkably kind, sympathetic, and devoted General Manager, Engineer, and Secretary in Mr. Valon Bennett. ["Hear, hear."] If the Board had at any time to select a motto for their billheads, he thought it might well be: "Courtesy with Service."

The VICE-PRESIDENT (Mr. W. E. Dean) eloquently voiced the thanks of the visitors to their hosts. He commented upon the cleanliness and orderliness of the works they had inspected. There was, he said, efficiency both on the works and on the district; and he felt sure the consumers must realize that they were getting good service and paying a reasonable price for their gas.

The CHAIRMAN returned thanks on behalf of himself and his co-Directors.

The afternoon was devoted to a visit to Chatham Dockyard, where the members were permitted, through the good services of the President, to inspect the cruiser which has been renamed the "Vindictive." Later, the visitors were entertained at tea in the Company's handsome new showrooms in High Street, Chatham; and here, with many expressions of thanks for a thoroughly enjoyable day, they took leave of their hosts.

THE GAS INSTITUTE OF NEW ZEALAND.

The Fourth Annual Meeting of the Institute was held at Christchurch on Feb. 16, under the presidency of Mr. F. W. J. BELTON, Engineer of the Christchurch Gas, Coal, and Coke Company, Ltd.

In the annual report of the Council for the year ended Jan. 31, it is stated that the membership of the Institute now totals seventy, as compared with sixty-seven for the previous year. The Council record, with deep regret, the deaths during the past year of two foundation members, Mr. A. H. Atkinson, of Blenheim, and Mr. J. W. Blackman, of Masterton. The former was Trustee to the Institute, and the latter Hon. Auditor.

PRESIDENTIAL ADDRESS

of F. W. J. BELTON, Engineer of the Christchurch Gas, Coal, and Coke Company, Ltd.

[Extract.]

The first part of the address consisted of an account of how the author reorganized the works of the Company. Mr. Belton then went on to say that one of the chief differences noticeable in New Zealand compared with gas-works operation in England was the use of large quantities of imported coals. The question of using New Zealand coals to the exclusion of imported coals at once engaged his attention. The publication of the winning papers in the "GAS JOURNAL" Coke Competition Number directed attention to the possibilities of using an admixture of non-caking coals; and after a consideration of the non-caking coals available in New Zealand, it was decided to carry out some experiments with lignites and semi-lignites, which are so plentiful in various parts of the Islands.

An important result obtained, said Mr. Belton, was that the use of lignite mixed with the unscreened caking coals enabled us successfully to carbonize highly-caking New Zealand coals in Woodall-Duckham vertical retorts. It is possible to use 50 p.ct. of lignite, and to obtain a good coherent coke; but it is rather too easily abraded, and the practice now is to use 30 or 40 p.ct. of lignite according to the class of bituminous coal coming forward.

The fact that good results can be obtained from New Zealand coals—results that compare well with the best results from imported coals—is indicated by the following:

Coal Used.	Gas Made per Ton.	Calorific Value.
85 p.ct. imported screened . . Unscreened N.Z.—	21,000 c.ft.	480 B.Th.U. gross per c.ft.
50 p.ct. State, 50 p.ct. Dobson . Bituminous slack and lignite mixture—	20,300 ,,	480 ,, ,, ,,
Dec., 1927	18,440 ,,	495 ,, ,, ,,
Jan., 1928	19,500 ,,	490 ,, ,, ,,

The water gas plant operation gave striking proof of the greater reactivity of coke made from the coal-lignite mixtures compared with the reactivity of the coke from bituminous coals only. Without any other alteration to the plant, the output of water gas rose considerably.

METHODS OF CHARGING FOR GAS.

The good or profitable consumer is not the one who uses a large quantity of gas per month, but the one who uses regularly every day. Two consumers may each use 10,000 c.ft. per month, but one takes it all in two hours, and the other takes the quantity steadily throughout the period.

Put shortly, in framing a scheme for gas prices, not merely quantity used must be considered, but also capacity to use. Of the two consumers mentioned, one might have been using 85 p.ct. of his capacity, the other 2 p.ct. of his capacity. Obviously, the one using 85 p.ct. of his capacity should get his 10,000 c.ft. for much less than the one using the same quantity, but only 2 p.ct. of his capacity. The latter entails the supplier in heavier expense for meter, service pipes, mains, and storage plant to meet his possible demand, than does the former one. I think one of the first attempts to apply this principle was in a scale of charges for gas for power at Macclesfield, in which I was concerned. In that scheme the price to be paid for gas was dependent upon the amount of gas consumed per horse-power of maximum load; the larger the amount per horse-power the lower being the price charged. Thus it was possible for a man with a 1-H.P. engine to obtain his gas as cheaply as the man with a 500-H.P. engine. In considering this matter, it must be obvious that the price charged for gas can be divided under two main heads: (1) Manufacturing cost; (2) cost of distributing from works to consumer. The latter divides into two sections, one of which is the same for each consumer, and the other of which is proportioned to his capacity to use or his maximum demand.

It is plain that the more costs can legitimately be put to the service and demand sections, the lower will be the commodity or gas price, and the more attractive the scheme will be to the consumer who is willing to instal more appliances, and take a more continuous supply from the mains. The necessity for a system of this type becomes very evident when an investigation of the costs involved shows that every consumer using less than 1400 c.ft. per month is supplied under the present method at a loss, and that that loss is borne by the consumers of more than that amount per month. In our case the distribution costs included under the two heads mentioned above, amount to about 60s. per annum per consumer as an average figure.

Elaborate methods of determining demand are out of the question on the ground of expense. Declarations of apparatus in use are also not desirable, as a consumer is liable to instal additional or larger apparatus and forget to notify the gas company. Furthermore, people would naturally object to a periodical compulsory inspection of their houses to see if the apparatus is the same as it had been (say) twelve months previously. Floor space in New Zealand also does not give any adequate basis for the demand cost. It appears that the simplest and most generally satisfactory basis for the demand cost is the size of the meter installed. The number of "lights" represented by the meters on the district was therefore determined, and the demand section divided out at so much per light per annum. Any other basis of meter size could, of course, be taken if desired.

The consumer may, under this system, fix what apparatus he likes; but if he uses that apparatus so as to overload the meter, the pressure will fall, and a complaint will be made. Investigation of the complaint will find out the cause, and a larger meter with a correspondingly larger demand figure will be fixed.

As far as the consumer is concerned, the service and demand charges can be combined in one which will vary according to the size of meter, but not strictly in the ratio of meter sizes, owing to the service charge portion being the same for all consumers.

The table below gives an idea of how this system would work out for various sized meters:

—	Service.	Demand.	Total.	Per Month.	
	£ s. d.	£ s. d.	£ s. d.	s. d.	s. d
5 lights .	2 3 4	0 15 0	2 18 4	4 10·3	(4 6)
10 ,, .	2 3 4	1 10 0	3 13 4	6 1·3	(6 0)
20 ,, .	2 3 4	3 0 0	5 3 4	8 7·3	(8 6)
30 ,, .	2 3 4	4 10 0	6 13 4	11 1·3	(11 6)
50 ,, .	2 3 4	7 10 0	9 13 4	16 1·3	(16 6)
100 ,, .	2 3 4	15 0 0	17 3 4	28 7·3	(30 0)

One feature which makes a scheme of this character more equitable and less open to criticism on the ground of partiality to the consumer who uses a large quantity of gas in any manner during the meter-reading period, is that the man with the smaller meter, and therefore the smaller demand capacity, obtains a given quantity (say, 4000 c.ft.) at a lower price than would be paid by a man with a larger meter, and therefore greater demand capacity, using the same quantity of gas.

The logic of this method of cost sub-division and allocation is so obvious that it is needless to enlarge upon it. In considering a scheme of this sort, one is, however, confronted with the problem of the slot meter. Fortunately, in New Zealand the number of slot meters is not so high as it is in England, and the matter is not one of insuperable difficulty. It is one, however, which requires a little more thought to determine the most suitable solution, which will depend to a considerable extent on the amount of discount at present given to slot meter consumers. Apart from its other good points, a scheme of this kind puts a very powerful weapon into the hands of a live selling staff.

NOTES ON THE CARE AND RUNNING OF GAS ENGINES.

By C. A. Sinclair, of Wellington.

Loss of efficiency in gas engines can usually be traced to one or other of the undermentioned causes.

Worn Liner, Piston, or Piston Rings.

In many cases the improvement in the performance of a worn gas engine will be very marked by fitting new piston rings. Fitting new rings does not mean procuring a set of rings for (say) a 6-in. liner, and expecting that to make a good job. It is essential to have the liner measured at the back end, where the most wear is, and the rings turned to suit this larger diameter, leaving a good amount of spring in the rings to allow for re-turning same. Also, due allowance must be made in the width of rings to allow the grooves to be turned in the piston, to accommodate the new rings, as it is useless fitting rings in the old worn grooves. Also, in the case of an old liner, it is much better to have the rings cut with a step joint, in preference to the old diagonal cut, as a ring that is tight at the front end of the liner might very easily have $\frac{1}{16}$ in. of opening at the back end of the liner, when the work is all done. Should the wear in the liner prove to be excessive, there is only one remedy, and that is to have the liner bored out, and a new piston and rings fitted. The only point of note about this operation is to see that the piston has the right amount of clearance—that is, 0·001 in. for each inch diameter of the piston on the skirt of the piston, and about double this amount at the back end of the piston. In running-in a new liner and piston, it is a good idea to notice at the start of the run whether the engine is running quietly, as if the piston is too tight it will cause the crank brasses to knock violently. As the only causes of crank brasses knocking are loose brasses, loose flywheel key, or a piston that is seizing, it is easy to tell in a case like this which is the cause of the trouble. Should seizing of piston occur, shut down at once, and let the engine cool down. It is not usually necessary to draw the piston in a case of this nature, as, after two or three short runs, the engine will run satisfactorily, provided plenty of oil is used for the first day or two. If it is impossible to get new rings or liner, and the engine is getting old, the following method may be used to clean the piston without having the engine refuse duty after cleaning: Instead of cleaning all the piston rings at one time, it is better to do half at one time and half at another, and it will be found that there is not the same amount of trouble in getting the engine away, as the carbon under the rings that are not cleaned will keep them tight.

Main bearings require to be backed off occasionally. This operation consists in withdrawing the bottom main brasses and filing and scraping the horns of the brass until the brass bears on the crown and turns perfectly free on the shaft. Neglect of this little point will often make an engine very heavy to pull round.

Another point worth mentioning is that valves should be ground at regular intervals. Many people let the valves go until they give trouble, whereas, if they had been attended to before they got into a bad state, they could be ground in a quarter of the time.

Worn Cams.

The cams should be checked for wear with a protractor about once in twelve months, and the result compared with a valve-setting diagram. Usually the exhaust cam will give the most trouble, and will pay to be kept in an efficient condition, as a cam that to the eye does not appear to be badly worn may easily so foul the incoming mixture that the engine will be only capable of developing about half load. We had an experience of this trouble in our works with an engine rated at 153 amps, which could not pull more than 90 amps. After renewing the exhaust cam only, the loading could be increased to 200 amps; and after three years' service it is still capable of over full load rating. In making new cams and rollers, it is, in my opinion, better to make them in mild steel than in cast-iron. The extra cost is more than repaid in the greatly increased life of the cam.

Ignition.

Loss of power is often caused by faulty ignition mechanism, or by wear in different parts of the same. Wrong setting and wear on the pecker of the magneto or striker arm can be easily traced by the protractor and valve diagram. The setting should be round about 30° advanced for running, in the ordinary class of gas engine—*i.e.*, engines of speeds up to 230 R.P.M.

Another trouble that is easily missed is the wear in the magneto bearings. This may not be enough to stop the engine, but will often cause missing; and if one charge is missed in ten, it will not be very apparent in the running of the engine. Nevertheless, a saving of 10 p.ct. in gas is worth while, even if the engine appears to be running satisfactorily. This fault is easily found if one looks for it, but is likely to be missed until a stoppage occurs. To find it, remove the magneto spring and turn the armature slowly by hand, and feel if there is any sticking in one place; or, better still, withdraw the armature, and look for rubbing marks. Should any sign of rubbing be apparent on the armature, the only satisfactory way of curing the trouble is to renew the bearings. Before replacing a magneto that has had bearings renewed, make perfectly sure that the armature is swinging free in the bearings, as the tendency is to make the latter too tight.

Electrical Leakage in Ignition System.

From experience of a number of engines on maintenance, we have found that in some cases the mica insulation of the spark plug will last up to twelve months; but where an undue quantity of oil comes in contact with the plug washers, or the liner is inclined to leak a little at the back joint, the washers are better renewed about every four months. These washers are easily made with a hollow punch, and are cheap. In fact, it pays to keep them in an efficient condition.

Exhaust Pipes Partially Choked.

This is a fault that is not very common, but when it does ocur is often difficult to locate, unless one has had experience of it. It manifests itself at the engine in a tendency to go slow. The engine will run, but will govern very little. I have seen a 2-in. exhaust pipe in which you could not put a $\frac{3}{8}$-in. rod, though the engine was still taking the load, but also an excessive quantity of gas. The final pipe on the exhaust is the one to look to, and the blockage is easily located, as the worst deposit is always at the end of the pipe.

Other papers presented at the meeting were "Experiences and Conclusions of a Sales Manager," by Mr. H. C. Ridley, of the Christchurch Gas, Coal, and Coke Company, Ltd.; "The 'New World' Cooker," by Dr. Harold Hartley, Head of the Research Department of Radiation Ltd. (communicated by Mr. W. H. Cattell, of Sydney); and "Increasing the Efficiency of the Smaller Gas-Works," by Mr. G. Heinz, of Hokitika. Mr. Ridley's paper will be published later in the "Gas Salesman."

FORTHCOMING ENGAGEMENTS.

June 2.—North of England Gas Managers' Association (Auxiliary Section).—Half-yearly meeting at the Gas Office, Grainger Street, Newcastle-on-Tyne, 2.30 p.m.

June 9.—London and Southern District Junior Gas Association.—Visit to the works of the Tunbridge Wells Gas Company.

June 11.—Bute Lodge.—Emergency meeting to welcome the masonic members of The Institution of Gas Engineers.

July 4-5.—Association of Statutory Inspectors of Gas Meters.—Annual conference in Birmingham.

July 9-12.—Association of Public Lighting Engineers.—Annual meeting and conference at Sheffield.

The Institution of Gas Engineers.

All meetings take place in the Council Room at 28, Grosvenor Gardens, unless otherwise stated.

June 11.—Council meeting at the Park Hotel, Cardiff.

June 11.—Dinner to the Council, by invitation of the President, at the Park Hotel, Cardiff, Sir David Milne-Watson, guest of honour.

June 12.—Council meeting in the Cory Hall, Cardiff.

June 12-15.—Annual General Meeting at Cardiff.

June 14.—Council meeting in the Cory Hall, Cardiff, for the appointment of Committees for the year 1928-29.

July 10.—Gas Education Committee.

Oct. 9.—Gas Education Committee.

Nov. 13.—Executive Committee of Gas Education Committee.

Dec. 11.—Executive Committee of Gas Education Committee.

MR. J. B. HANSFORD'S PRESIDENTIAL ADDRESS.

Eastern Counties Gas Managers' Association, May 16, at Bedford.

First I wish to thank you for the honour you have conferred on me and the compliment you have paid to the Company I have the privilege of serving. I imagine that one of the reasons for an Association such as this electing a President from among its members is that some of his experiences and outlook should be given to members, with the idea that others may benefit by his mistakes, if by nothing else.

I therefore propose to divide this address into two parts, beginning with a few opinions on present-day conditions, on which I would ask you to break the unwritten law by fully discussing the few poor thoughts I am capable of giving you, for I believe that discussions of this kind are helpful to an Association of this category. The second half will give you some particulars regarding the undertaking of which I have charge.

Until recent years there can be no doubt that gas undertakings were too self-satisfied and inclined to take advantage of their monopoly. This was due to the industry's long period of existence, which has now considerably passed its century, and also very greatly to the hidebound statutory conditions of its trading, with little competition. Present-day conditions, however, have caused us to alter our ideas considerably. We have to-day a rival in electricity, brought constantly before the eyes of the public by the Government and Press of the country, to which may be added the human craze for something new.

Service to the Community.

In the past, it appears to me that the outlook of some of us had been confined to the manufacture of gas only, and we had almost ignored the other view—that of service to the community, as distributors of heat in a form which is economically unapproachable by our competitors, by reason of the thermal efficiency of our process of directly converting our raw material into fluid heat.

Our statutory conditions (referring principally, of course, to those companies which are working under the sliding-scale) almost compel us to look on the various departments of our business with the idea of making them self-supporting, such as the hiring of gas apparatus and the fixing and fitting of the same beyond the customary allowance of service pipe free to the consumer. This is not always so with our competitors, who look upon these charges as part of the necessary expense which is incurred in adding a new consumer. Moreover, in a great many cases, a nominal rental is charged for any apparatus hired out. Their principal concern is output of current. They do not look for any return upon the capital expended upon the installation, and very little, it would appear, on the capital expended upon their apparatus when maintenance charges are considered.

Gas undertakings, on the other hand, must of necessity have as their main consideration the selling price of gas. The endeavour is, therefore, as far as possible, to make all other departments self-supporting. If we are to compete, we surely should adopt a similar policy to that of our rivals. A £5 fixing bill will go a long way towards reducing the running cost of an apparatus; and in these days customers are anxious to avoid these charges, and are pleased when they get, as they think, something for nothing.

Fixed Minimum Dividend.

I have long been of the opinion that gas legislation is sadly in need of revision, so that we may meet our rivals on similar grounds. The sliding-scale was no doubt good enough in the days of the monopoly, but to-day I think it is old-fashioned, out-of-date, and a hindrance to real progress. I am also of the opinion that a fixed minimum dividend should not only be allowed to individual companies, but be of general application.

We are surely not responsible if we are overtaken by national troubles such as strikes, wars, and rumours of wars. We should be authorized to pay the same dividend—namely, a fixed and reasonable return on the money employed—altogether independent of the price of gas. We cannot otherwise continue to attract the capital so necessary for the expansion and advancement of the industry, or make that capital secure in the eyes of the investing public.

With regard to the proposals, now before the industry, of adopting two-part or multi-part tariff systems of charging, I feel this is very much a matter of local conditions, and I am further of the opinion that this problem should be left to individual companies to work out their own system of charging. This would result in offering attractive prices for the load any particular undertaking wished to cultivate; and, if the obstacle of dividends is removed, this will no doubt result. Personally I am in favour of a scale based on decreased price for increased consumption.

With reference to the "stand-by charge," I cannot see this being adopted to any large extent in England. I, for one, would not risk adopting this, which might result in the smaller consumers taking advantage of other substitutes, and result in decreased output and revenue.

Any new system must start very slowly to avoid the risk of decreased revenue. The public are very slow to understand that an alteration of this kind is for their benefit. We have had an example of this in our experience with the change to therms.

Amalgamations.

We hear on all sides to-day about amalgamations and the linking-up of works; and this, I am convinced, must be the future tendency. Here again it is our legislation which is partly at fault and which prevents this being done in the gas industry in many desirable instances.

To obtain the necessary statutory authority is a costly business to-day, with every borough, urban, city, and county authority able to oppose any expansion of this kind. They do not realize that it is a necessary public service. Some people seem to think historical things must give way to new ideas—such as the motor car to the horse. They shut their eyes to the evolution that has taken place within the industry. But I am inclined to think this is to some extent our own fault, for service has been lacking in the past.

A consumer to-day expects full value for his money, and reliability of service through his appliances. The article sold must therefore be up to standard always (*i.e.*, constant pressure, purity of unchanging composition, and not a variable gas mixture), with unchanging heating value; otherwise he will turn to other methods, even if more costly. This, I feel, is most important if we are to be pre-eminent as fuel distributors.

Some months ago I submitted to the National Gas Council an idea for the basis of a scheme which would enable amalgamations to be more easily undertaken, especially of the smaller companies, who will no doubt suffer by the electric grid sooner or later. I feel that if any works should be compelled to close down as the result of this competition, fostered as it very largely is by Government influences, it will only too readily be used for propaganda purposes, and must have its effect on the investing public.

The idea in my mind was to establish a National Fund; every undertaking being asked to contribute a fixed amount per million per year, to be controlled by a central administrative body. If a small works was unable to carry on satisfactorily, the undertaking should be taken over by the most suitable neighbouring works, and the cost of the connecting main should be borne wholly, or partly, by the fund, so as to make the amalgamation a paying proposition, and, at the same time, enable the shareholders of the absorbed company to be compensated at a nominal rate.

The Royal Charter.

I am glad our Mother Institution has, at last, realized the necessity for the gas industry to possess a status similar to that of other professions, and is seeking to obtain a Royal Charter. We shall now hope to prosper still more; and I welcome the decision to open the membership to all technical men engaged in our industry. But why limit it to "Town Gas"? Surely it should be "Gas Engineering," and might include all qualified men engaged in the carbonization of coal and its allied processes.

The District Associations will, I am convinced, benefit secondarily to a considerable extent, inasmuch as they can better perform the more helpful domestic, social, and commercial sides of our complicated business. In this connection there is one other point I should like to mention before bringing this part of my address to a close. I believe there is still a great future for the gas industry, but with the ever-increasing competition, made possible by scientific improvements in the utilization of heat, it is vital that we should keep abreast of the times. Gas engineering to-day is very different from what it was in the days of our forefathers, but it would appear that some undertakings still view the remuneration of their chief officers in the light of those days.

The most glaring instances of unsatisfactory remuneration are to be found, generally speaking, in towns where the undertaking is under the control of the municipalities. These are largely run nowadays by men who have no conception or experience of the responsibilities of the man in charge, or what is an adequate salary for such a position. If the industry is to meet competition squarely, it must attract the best men and the best brains; and this can only be done by paying salaries at least equal to those paid in other businesses for similar responsibilities. Here is the opportunity for The Institution of Gas Engineers to follow the example of other professional organizations, and raise the status of its members. The possession of a Charter will be a great achievement, inasmuch as the Institution will now be able to ensure that only properly qualified men are appointed to responsible administrative positions, and should have something to say regarding the remuneration of

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such positions. The junior positions will, in due course, benefit in like proportion.

EIGHT YEARS' WORK.

I have given this paper the above title, as I propose to give my experiences and the problems as they arose and were dealt with during the eight years I have been in charge of the Bedford Works, rather than fuller reconstructional details.

I took over the management of the Bedford Works on Feb. 1, 1920—the period during the aftermath of the war, when labour troubles, unsettlement, and high prices were ruling on every side, with decreasing output of gas owing to the munition factories shutting down, &c.

I might here state that the Company had been fairly prosperous before the war, paying good dividends and selling gas at 2s. 3d. per 1000 c.ft., but it had been jogging along for so many years in the old monopolistic manner with very little thought for the future, so that when electricity began to take the lighting load away, the loss was looked upon as inevitable. Then came the war, with the enormous rise in the cost of labour and materials; and, consequently, for ten or twelve years the Company just marked time. The price of gas had more than doubled, and the dividends had fallen accordingly, and were in 1920 only 2¼ p.ct.

During the war, Bedford was a large Military Centre; and upwards of 20,000 troops were billeted within and around the town. This, of course, increased the demand beyond the capacity of the works; and with the labour troubles, something had to be done to increase the gas production, resulting in the installation of a charging machine and nine new settings of 6's, and altering one of the existing retort houses in the easiest way to meet the difficulty.

I have appended a plan of the works as they existed in 1920, and also one of the works to-day.

This retort house was capable of making about 850,000 c.ft. per diem, and we were sending out about 900,000 c.ft. per diem. I therefore realized that my first problem was to increase the carbonizing plant in some way or other, without extending this poor arrangement. The quality of the gas varied from 400 to 600 B.Th.U., with up to 30 p.ct. inerts!

There were other retort settings—in No. 3 House five beds of 5's, and in No. 4 House seven beds of 7's, all hand charged, but, unfortunately, almost impossible to work.

The labour employed in gas-making in this one house was 35 men, with a weekly wage bill of £180, or 1s. 9d. per ton of coal carbonized. This included six coke wheelers, who wheeled the coke into the yard, and six quenchers (two per shift), whose duty was to throw buckets of water on the coke, and stack it. I therefore found an old and undersized works, with a small splash of modernism—the only thing to recommend it was its original cost!

On my second Sunday on going into the works, I was informed that the machine was not working, and, on investigation, I found the overhead trolley wire lying on the floor muddled up with the machine. These breakdowns were common before my time, and it was usual, when anything went wrong, to revert to hand charging for days at a time, with the natural results of blocked ascension pipes and all the other troubles from overheated charges.

However, something had to be done to make some money. It was, of course, impossible to raise any capital—especially as the Company's stock had been sold at £180/200 per cent. before the war.

My first job, obviously, was to cut down the retort house labour costs; and this was done by the erection of a coke telpher running in front of the retort benches and into the yard, the order for which was placed in March. The installation was put to work in October, whereby nine stokers' wages were saved.

Our railway siding accommodation consisted of one set of rails at the back of the retort house and a turntable to take wagons into the yard, and another turntable giving access to the yard track. To deal with the traffic, two horses and two men were employed nearly all day, including Sundays. This was, of course, costly; and to cut it down we purchased a 2-ton travelling crane, which did all shunting, coal in and out of stock, and coke loading. The rails were of the tram type and very rocky, and therefore a heavier crane could not have been used.

The sidings have now been extended and replaced by modern rails, and the crane has been replaced by a 5-tonner. This system has proved, for our purposes, most satisfactory, doing all shunting operations, &c. With the use of grabs, all coal and other materials are put into and taken out of stock, and digging and many other jobs can be accomplished.

Then came the coal strike of November, 1920. We had very little coal in stock; and this resulted in the reduction of gas pressure and consequent decreased revenue. However, a bright spot was on the horizon—the Gas Regulation Act of 1920. I need not say we lost no opportunity in applying for an Order under this Act at the earliest possible moment, and, thanks to several members of this Association, we were one of the first five companies in this District to come under the Act; our Order being dated March 23, 1921.

Purification.

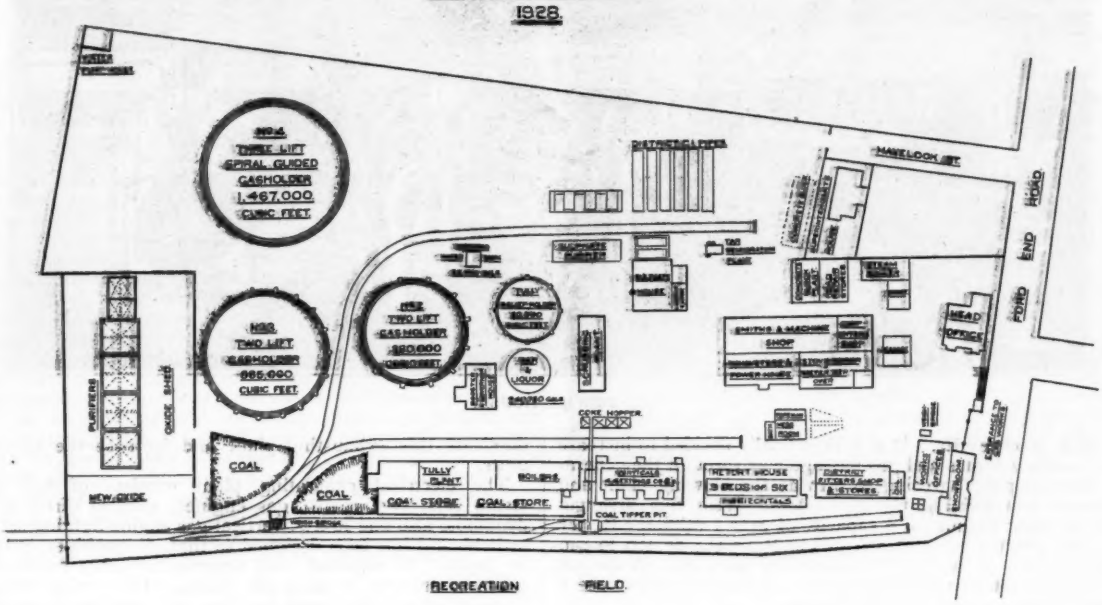
At this period there were two other outstanding sources of worry—purification, and generation of electricity. When the charging machine was installed the dynamos were put down in the exhauster house, which was unsuitable for housing electrical machinery and was the cause of many troubles.

The dry purification plant comprised two 25 ft. by 20 ft. and two 20 ft. by 20 ft. boxes; two overhead 30 ft. by 25 ft. boxes; with two 20 ft. by 20 ft. lime catches all fitted with 20-in. connections and Weck type valves in the bowels of the earth. These had received little or no attention since they were installed. As a result, we often had to change three or four boxes a week, and during my first winter we were frequently changing boxes all day and all night. The purifiers were at the entrance of the works, with no space for revivifying. The oxide had therefore to be carted to the other end of the works for revivification. It is not surprising that purification was then costing nearly £2000 per annum, or 2d. per 1000 c.ft.

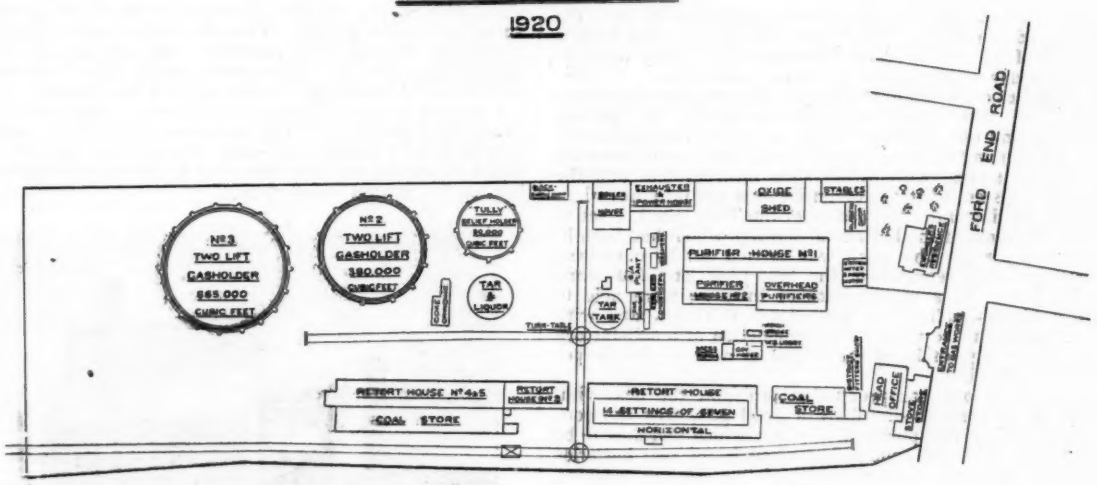
One December experience (one of many such) with these purifiers is perhaps worth recording. I decided to try to clean a valve, to stop the leakage in one of the overhead boxes, and for this purpose shut down. We managed to refix a new seat to this valve, and commenced to make gas again. When the exhauster was started, we found a back-pressure up to 40 inches. I had visions of all sorts of trouble, and suspected the vertical rising main to be blocked up. We tried this, but with no result. The valves that had been shut were gone over again, without effect, and we eventually traced the trouble to the outlet valve of the scrubber. This was of the vertical worm spindle type. The cover was removed, and the slide door found to be down. The spindle had no sign of having possessed any thread whatever.

By this time—the winter of 1920—the few minor improvements I had been able to effect—*i.e.*, re-arrangement of labour

BEDFORD GAS WORKS
1928.



BEDFORD GAS WORKS
1920



and better working in the retort house, with a little bit of system in the daily routine work, and working to a calorific value of 500 B.Th.U.—had considerably decreased the number of district complaints.

The unaccounted-for gas at this period was 12 p.ct., and the district fitting staff were occupied chiefly with changing dead meters (the result of pumping paraffin by the gallon into the gas, for naphthalene troubles), clearing services, and general complaints.

However, these problems of purifying, distribution, &c., had to wait, as the most pressing thing was to have more gas-making plant, to enable us to maintain some reliable gas standard. (I was hoping for the monetary relief the Gas Regulation Act would bring.)

Installation of Tully Plant.

My thoughts, of course, turned to the modern systems of verticals then coming into favour, but, upon going into this scheme, I found a unit of 1½ millions per diem would cost, complete, about £60,000, and was therefore out of the question. I then considered a C.W.G. plant; but the cost of plant and the value of coke and oil caused me to put this scheme on one side.

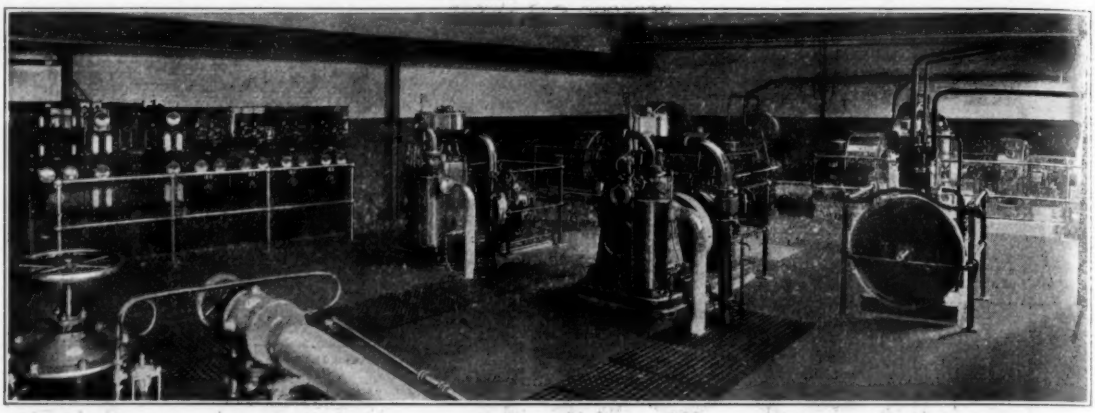
I then went into the question of a complete gasification plant, and the possible results when using all coal. This seemed the most economical proposition, not only as regards capital cost, but as being capable of producing a cheap diluent gas. A tender was obtained for a Tully gasification plant, which I recommended my Directors to instal. I realized at the same time that if my anticipation of the increased business to be obtained in Bedford materialized, this would possibly mean in ten years or so a revision of the whole gas-making system. The Tully plant was specified for a capacity of 750,000 c.ft. per diem for each generator, and therefore added 100 p.ct. to the gas production. The construction of this plant was started in February, 1921; and then came along the three months' coal strike of 1921, which caused still further severe loss to the revenue account, especially as we were forced to purchase foreign coal at £5 per ton.

The old No. 5 Retort House was used for housing this plant, with part for the blower house; and the walls were taken up by means of a steel framing, and filled in with brickwork. The opportunity was also taken to remove the dynamo to this building.

The boiler plant had also to be considered in conjunction with this plant. The old boilers consisted of two 15 ft. by 5 ft. Cornish type, and one 30 ft. by 8 ft. Lancashire type housed by itself in a building erected in 1916 when more steam was required for running the dynamos. We pulled out the retort setting in No. 4 House, and converted this into the present boiler house, shifting the 30 ft. by 8 ft. boiler, and adding a further one of similar size, with the water softening plant at the end of the house; thus doing away with the Cornish boilers.

The Tully plant was put into operation in October, 1921, and, with re-arrangement of labour, gave us much better working conditions. The make of gas per ton gradually went up, but the guaranteed output of the plant was not realized. The plant was specified to have gas-driven blowers, but the arrangement of a direct coupled four-cylinder engine and blower proved to be considerably undersized. These were replaced by two 57-H.P. horizontal engines, with belt-driven fans of considerably increased capacity. Even this did not have the desired effect, and, after further consideration, the generators were relined, which resulted in an increased output, but still under the guarantee. The blowers were again increased, and still better results were obtained, but not the full guaranteed capacity.

We worked for some considerable time under these condi-



POWER HOUSE.

tions with good results. It was then finally decided to increase both blowing volumes and gas passage-way through the generators, the Company agreeing to provide the blowing plant and the contractors relining the generators. With this arrangement, the plant became of a capacity of over 1 million c.ft. per diem, and produced gas of 320 to 350 B.Th.U., or 180 to 200 therms per ton of fuel. We have never been able to use all coal in this plant for various reasons, and were obliged to use a mixture of three of coal to one of coke.

District Work.

By this time our district work had begun to wake up. We re-commenced the simple hire of gas cookers, &c.; and from a fitting staff of six we gradually increased until to-day we have 24 men regularly employed, not including mainlayers.

The old stores consisted of the present showroom at the works entrance, and was most inconveniently placed for getting materials in and out, and the fitting shop was the present oil stores. An existing building—No. 1 Coal Store—was converted into a district stores, with fitting shop incorporated, and the "B.C.G.A." system of store accounting was put into operation.

With the putting into commission of the Tully plant, I set to work to reset some of the horizontal settings which had been in use over five years. The work was carried out by ourselves. Five settings were replaced in the first year, and four each successive year. As a consequence of this, we were able to produce a higher-quality coal gas of 550 B.Th.U., and with 50 p.ct. dilution this resulted in the production of a satisfactory gas and an average make of mixed gas of over 90 therms per ton of coal carbonized.

Having settled our gas production problem, the next vital necessity, if we were to distribute a good gas, was the condensing, scrubbing, and purification plant, which had now to be reconstructed. The old condensers consisted of two batteries of annulars, and the scrubbing plant of two Walker washing machines, which had been sadly neglected and were in bad condition. The exhausters also had to be considered at the same time; these being very much undersized.

I decided to erect one of the annular condensers outside the retort house, and to place a new water-cooled condenser alongside it; also to put down one new exhauster and remove the best of the originals to a temporary exhauster room, constructed in part of No. 3 Retort House, until such time as money and other conditions made possible the construction of an exhauster and power house. I decided, also, to instal two Livesey washers and a rotary scrubber. It was not practicable to convert or add to any of the old scrubbing plant.

Tenders were then asked for four 40 ft. square by 6 ft. purifiers, with 24-in. valves and connections, to be erected at the end of the works. This was in 1922, when gas-works contractors were looking for work to keep their shops running, with the result that the purifying plant cost very little more than pre-war price; but, unfortunately, the engineers' strike came along, and hung up the completion of the work. The old overhead boxes were dismantled, removed, and re-erected as catches to the new boxes. The shed covering these purifiers was made locally. Purification now, with an increased make of 38 p.ct., costs £140 per annum, against the previous cost of £2000.

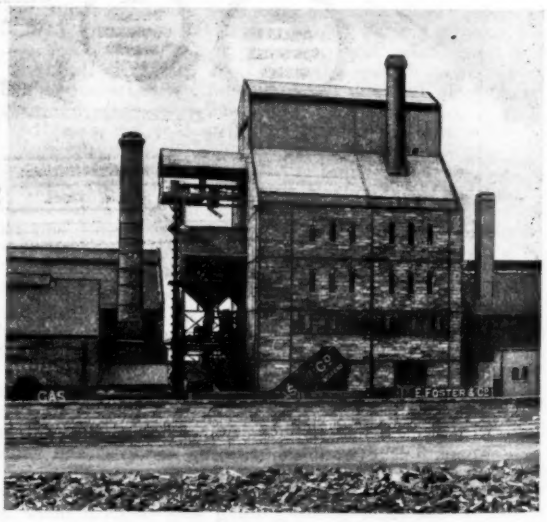
After the re-arrangement of the purifiers, I decided to convert the original purifier house (erected in 1863) into what is now the exhauster and power house, and with this it became necessary to alter the condensing plant. This was done by adding a further water-tube condenser to the existing one, and removing to the present site, with new connections. The remaining purifier houses were converted into works fitting shop, smiths' shop, carpenters' shop, cooker repairing shop, with meter repairing shop over. This work was carried out in 1925-26 with our own labour.

The power house is equipped with two 80,000 c.ft. per diem Donkin exhausters with 24-in. connections. There is room to duplicate this exhausting plant and increase the size of the units.

The electrical generating plant consists of two 25-kw. steam sets, two 55-kw. gas engines, coupled direct to Allen dynamos, also one 10-kw. vertical gas engine lighting set. The switchboard has been designed so that all machines can be run in parallel, if required, and separate switches control cables taken to different parts of the works. The works fitting shop is equipped with the usual machine tools and has the advantage of being spacious.

The unaccounted-for gas in 1920 was 12 p.ct. This called for attention as soon as possible. The first item to consider was the station meter, which was housed in the building now converted to a motor garage. This meter was erected in 1882, with a capacity of 40,000 c.ft. per hour. On opening up the drum, it was found to have innumerable small holes; and the estimated cost of replacing or repairing it was excessive.

I decided to erect a house to contain the station meter, holder valves, and governors. The cost of a new ordinary meter was very high, so a venturi tube meter was decided upon, the cost of which converted the thousands into hundreds of pounds; and it has, so far, proved satisfactory.



Vertical House from Sports Field.

In our district we have 52 miles of mains, 30 miles of which were under 6 in. Many 3-in. mains, or smaller, were serving large districts; and to maintain satisfactory pressures, I decided to divide the district into three parts. The mains leaving the works were two 12-in. and two 15-in. From the 15-in. main a 12-in. was taken a considerable way into the more congested area, and this has gradually been lengthened as opportunity occurred. The other parts of the district have similarly been dealt with, by enlarging mains to be used as trunk mains.

It has been imperative that large portions of mains should be relaid and increased every year to meet the increasing demands; and to this end we purchased the necessary mechanical apparatus to enable this work to be carried out cheaply and quickly. We have, during the last few years, relaid four or five miles of mains each year, and we hope to continue at this rate for some years to come.

Another problem was the reinstating of roadways and footpaths, which used to be carried out by the Town Surveyor's Department, and was very costly. I asked for a schedule of prices from this Department, but was unsuccessful in obtaining

one, so that I decided to undertake the work ourselves. We purchased a 10-ton steam roller and a motor lorry, and took on the necessary staff. This department has been most successful, reducing the cost of the work from one-third to one-half the Borough's charges.

Our office accommodation was also utterly inadequate. The whole staff were housed in what are now the works offices, and it was impossible to arrange anything like system in one general office. The slot collection department offices were over our showroom in the town. The collectors returned at the end of the day and handed-over the bags of money, the contents of which were emptied into heaps upon the floor, and three girls were employed to count it into 5s. bags. No receipts were given to the consumers. Needless to say, re-arrangement was soon accomplished here.

The Engineer's residence has been converted into a set of new offices. This was carried out with very little structural alteration, and has made an excellent suite of offices. The old offices are now used as offices for works accommodation, chemical laboratory, and official testing room. The stores make a good showroom, with entrance from the street.

The sulphate of ammonia plant then called for attention. At this time we used to send out of the district 90 p.ct. of our output. It was then I decided to experiment with the manufacture of neutral salt. Eventually, I evolved the double saturator process, which has been working ever since with most excellent results, continuously producing a neutral salt of 21 p.ct. N, without any trouble. Upon completion of the boiler house, the sulphate plant was removed and re-erected in the present house with new saturators and drying table.

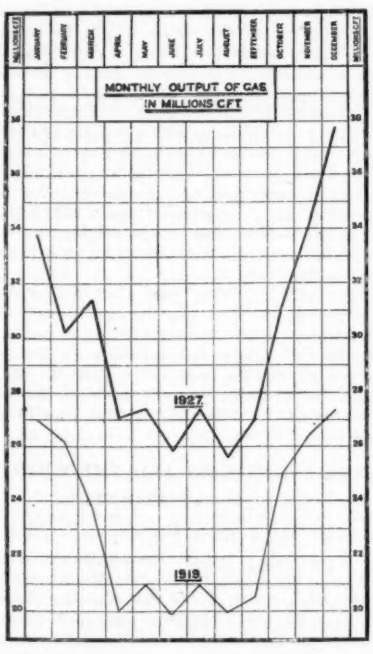
Greater Storage.

Our load had now increased to such an extent that the peak load (cooking load), which is often 50 p.ct. of the day's output, was about 50 p.ct. of the available storage. The condition of the largest holder gave cause for anxiety, as wasting of the plates had made it necessary to put some hundreds of patches; and, as the extent of this wastage was unknown, I decided to recommend my Directors to erect another holder. This implied the purchase of additional land, obtaining of Parliamentary powers, and issue of new capital.

A contract for a 1¼ million c.ft. steel tank and holder was given in October, 1925, and the holder completed and put into commission in November, 1926, the Company carrying out the excavations and foundations. To do this we put a railway siding into the new land, and the digging was done by our steam crane; 2500 cub. yards of earth were removed in three weeks, and the concrete, with reinforcement, completed in four months, with considerable saving in money.

New Glover-West Installation.

The maximum output had nearly reached our resources of production. Various new methods of carbonizing were fully considered, and the greatest saving in total costs was shown by verticals. I therefore recommended my Directors to instal a vertical retort plant. An order for part of the scheme was



placed with West's Gas Improvement Co., Ltd., in October, 1926, with a guarantee of 1,280,000 c.ft. per diem and 90 therms of 456 B.Th.U. gas per ton. The first part of the plant was started to work in December last year, and the other gas-making plant was shut down.

The Contractors' guarantee has, during the last three months, been exceeded. The average therms per ton of coal carbonized for the first three months of the year amounted to 93·5. On a few days' test, we passed the 100 therm mark. The coke sold per ton is 6·3 cwt., and the average steam to the setting is 31 lbs.

These settings are the first portion of the installation. We are now putting in the foundations for a further two settings, and in this contract is included a waste-heat boiler, whereby further saving of fuel and labour will result. To ensure a good water for use in this boiler, it is proposed to instal a zero softening plant. For this purpose the old Tully plant blower house will be utilized. The soda-lime Kennicot plant will be moved into this house. The water will first pass the soda-lime plant and then through the zero plant, and will then run to an underground storage tank over which will be the waste-heat boiler pump house. Another saving has been effected by the construction of a well for the necessary water for works purposes. Previously, we used the town supply at a cost of over £500 per annum. There have, of course, been many other jobs I have not mentioned—ash separating and coke screening plants, concrete block making, &c. The greater part of these re-arrangements has been carried out by our own labour; and this has enabled jobs to be done which otherwise would have been impossible.

The Social Side.

In 1922 we formed a Works' Social Club with a weekly subscription of one penny. In 1924 the old exhauster house was converted into a club room where concerts, whist drives, lectures, &c., are held, with a Christmas treat for the kiddies. In the summer, sports are held in the field adjoining the works. In connection with the Social Club, there are also a Coal Club and a Sick Benefit Club, in addition to an Outdoor Sports Club. This movement has been well patronized by the works and staff, and has done much to promote a good understanding between all sections of the Company's employees. The present club room building will eventually be replaced by a larger one, which it is proposed to erect on the sports field adjoining the works.

The Company has, of course, been forced to raise several capital sums during this period, and at each issue the Directors have allotted a certain amount, at the reserve price, for the Company's employees, which has been taken up on easy-payment terms.

We also have a continuous scheme whereby the Company allows 5 p.ct. on all sums deposited; and when sufficient is standing to the credit of a member, stock is purchased in the open market.

A works magazine entitled "Gas Progress" was started in 1925, and is published annually. This gives a report of the Company's activities during the year, and an outline of the proposed schemes for the coming year, in addition to a report on the social side. The object of this is to let the employees see beyond a day-to-day outlook; and this again, I feel, has been greatly appreciated.

There are still a few improvements in contemplation which I might perhaps mention. With the completion of the vertical installation, it is proposed to pull down the old horizontal retort house and the Tully plant and buildings; the relief holder will be dismantled; and the tank will be converted into a tar and liquor tank. This will leave room for future extensions of plant.

The Institution Cardiff Meeting.

Arrangements are well forward for the Cardiff Meeting of The Institution of Gas Engineers, opening on June 12, on which date H.R.H. the Prince of Wales, Honorary Lite Member, is to unveil the beautifully-designed National Welsh War Memorial, erected in Cathays Park. The Reception Committee of the conference recently held a meeting, at which the Lady Mayoress (Mrs. Howell) presided, when the final arrangements were approved. Over 700 members are expected to attend. All the hotel accommodation has been taken up.

A Loan for Ruhr Coke-Oven Gas.

It is understood that arrangements have been concluded by a consortium of American banks, headed by Dillon Read & Co., and Halsey Stuart & Co., for a 25-year $10,000,000 loan, bearing 6 p.ct. interest, to the Aktiengesellschaft für Kohleverwertung (Coal By-Products Utilization Company)—a Company formed in 1926 by the leading mining concerns of the Ruhr to utilize for commercial gas supplies the waste gases of the Ruhr coke-ovens. Associated in the financing are the International Acceptance Bank and the J. Henry Schrodder Banking Corporation of New York. The proceeds of the loan will be used for the development of the Company's gas-distribution system, which at present covers a wide range of German cities and industries. The loan is to be issued shortly. Behind the expansion of the Company are such well-known coal and steel interests as the United Steel Works Corporation, and the Hoesch Koeln-Neuessen, Harpen, Goodhope, Krupp, Stinnes, Gelsenkirchen, and Mannesmann concerns.

CHEMICAL ENGINEERING GROUP.

ANNUAL MEETING AND DINNER.

As a start-off to the Chemical Industry Conference from May 11 to 15, organized by the Society of Chemical Industry in co-operation with the London Section, the Chemical Engineering Group, and the Institution of Chemical Engineers, the annual general meeting and dinner of the group took place at the Les Gobelins Restaurant, Regent Street, London, on Friday, May 11—Mr. H. Talbot (Chairman of the Group) presiding.

The report of the Committee for 1927, which was adopted, stated that the membership had increased by 12 to 459; and general satisfaction was expressed at the success of the Group and the great interest displayed by the members. Reference was made to the fact that the Group had continued its policy of co-operating with other learned bodies and local sections of the parent Society.

Mr. H. Talbot was elected Chairman; Mr. H. J. Pooley Hon. Secretary; and Mr. F. A. Greene Hon. Treasurer. The following were elected to the Committee: Mr. A. S. Calder, Mr. F. Esling, Prof. W. E. Gibbs, Mr. S. G. Ure, and Mr. J. E. F. Bogel.

The annual dinner was presided over by Mr. Talbot, who gave a hearty welcome to the many guests present, including Mr. F. H. Carr (President of the Society of Chemical Industry) and Sir Alexander Gibb (President of the Institution of Chemical Engineers).

Mr. F. A. Greene, proposing "The Society of Chemical Industry," spoke of the good relations existing between the Society and the Group, and assured the Society of the fullest assistance and co-operation from the Group on every possible occasion.

Mr. Carr, responding, said that the Council of the Society now regarded the Group as part of the Society, and the Society as part of the Group. It was recognized that the Society had benefited very much at all times from the assiduous work of the Group on behalf of chemical industry; and, as a matter of fact, many of those associated with the formation of the Group, including Mr. Greene, had worked with great success in the interests of the industry as a whole, long before the existence of the great idea of chemical engineering in this country. He paid a tribute to the excellent work which had been done by Mr. Talbot in the interests of the Group.

Sir Alexander Gibb, submitting "The Chemical Engineering Group," recalled how it was started nearly ten years ago, and now had a membership of nearly 500. Thanks largely to the work of the Group, enormous strides had been made in this country in chemical engineering. Whereas before the war there was a tendency on the part of foreign nations to steal the results of our laboratory research and apply them, the position had completely changed, and we were making real practical use of the results of research in this country, and getting down to real work of that kind. Mr. Talbot had practically driven the Group to success, in face of all opposition.

Mr. Talbot, acknowledging the toast, said that though he might have played a small part in the development of the Group, the success that had been attained was really due to the members themselves, and particularly to the members of the Committee. To Prof. Hinchley the credit was due for starting the Group; and to him also was due the credit for the formation of the Institution of Chemical Engineers. Events had shown that the Group had amply justified itself. For instance, when the first Professor of Chemical Engineering was appointed under the Ramsay Memorial Scheme, a member of the Chemical Engineering Group in Prof. Williams was selected for the post; and now that a successor to Prof. Williams was required, another member of the Group in Prof. Gibbs had been appointed. Again, the first President of the Institution of Chemical Engineers was a member of the Group, as was the second. Speaking generally, he was convinced that there was something in the Group idea; and by co-operation with the parent Society and other bodies, he looked forward to this good work being continued.

Mr. Carr then gave a short address on "Some Chemical Engineering Aspects of the Fine Chemical Industry."

CHEMICAL INDUSTRY CONFERENCE.

May 11 to 15.

The first session for the reading of papers was held at the Institution of Civil Engineers, Great George Street, S.W., on Monday morning, May 14—Sir Hugo Hirst, Bart., presiding.

The Chairman in opening the proceedings explained how the conference was being held as a gentle reply to the allegation or reproach by Lord Balfour as regards the chemical industry of this country. Lord Balfour did not seem satisfied that the chemical industry had pulled its full weight. This allegation had also been made against the electrical industry, in which he himself was engaged. For many years the electrical industry of this country had been satisfied to confine itself to the effort of finding out the electrical truth. They produced electricians and scientists second to none in any country, and had to the credit of the industry inventions and pioneer processes of which they could justly be proud. It had nevertheless been necessary to realize that real progress did not depend altogether on this somewhat narrow line of endeavour, and that it was necessary to apply knowledge so gained to the electrical and other industries. The consequence was that the electrical engineer had realized that the transport engineer, the mining engineer, the metallurgical engineer, the shipbuilding engineer, and engineers in every other walk of life could, by linking up be most helpful not only to the electrical industry, but to the development of all the industries of the country. In some countries the endeavour had been made to get over the difficulty by having one engineer who took first a degree in electrical engineering and then a degree in chemical engineering or chemical science, and on top of that, perhaps, a degree in commerce. He did not think that they in this country were yet suited to take that course. So far as pure science was concerned, they were not behind any other country in the world, but so far as the application of chemical science was concerned there was a tremendous amount of work to be done; and this involved linking up with the physicist, the metallurgist, and the engineer. Speaking as an amateur, it seemed to him that the task that the country expected the chemical engineer to solve was to instal King Coal in his old might and power. Coal, next to a neglected agriculture, was practically the only raw material which this country possessed. It was practically the only raw material on which their industries could be built up. In solving the problem, the chemical engineer or the chemist would have to work with the electrical engineer who wanted cheap power from the coal, with the gas engineer who wanted cheap gas, with the mining engineer, the oil engineer, the fertilizer engineer, the smokeless fuel engineer, and, in fact, every type of engineer. There would have to be co-operative work to solve this great problem; and he pictured that one day it would be necessary for those engaged in the various branches of industry dependent upon coal to come forward with their big cheques and subscribe a matter of £250,000 or more in order that co-operative work might be done in regard to coal, just as the Germans were doing to-day in connection with the Bergius process and lignite. This could be done by investigation and collaboration between the different types of engineer and the chemist in order that conclusions might be arrived at which would enable big commercial industrial experiments to be made. When those experiments had been made, he saw no reason why their commercial application should not be successful. Indeed, he visualized that instead of importing £40,000,000 worth of oil, they would be producing benzole out of their coal, and offering cheap power and cheap gas to every industry in the country. Only in that way could they anticipate the rejuvenation and resurrection of the position that England once held in industry. It all depended upon the right use of coal and on the proper utilization commercially and industrially of the bye-products; and this did not mean just finding out what these bye-products were.

Continuing, the Chairman said that Sir Arthur Duckham was to have read the first paper, but unfortunately he was prevented by illness from being present. During the war Sir Arthur and himself made deep studies of the possibilities of producing nitrates in this country in case the submarine warfare prevented the importation of nitrates from Chili.

Dr. E. W. Smith then read Sir Arthur Duckham's paper, an abstract of which follows.

THE FUEL INDUSTRIES AND THE WORK OF THE CHEMICAL ENGINEER.

By Sir Arthur Duckham, K.C.B.

Chemical engineering stands for efficiency in operation and development, and therefore its application to the fuel industries is of vital importance. I would describe the chemical engineer as a man, first having sufficient chemical knowledge to appreciate the trend and results of chemical research, and the ability to use such knowledge, and, secondly, having sufficient engineering training and practical experience to devise and operate plant with which to obtain the desired results.

To attain the desired standing of a chemical engineer, I would lay most emphatic stress on the necessity for practical

experience. In process development and operation, practical experience is of far more vital importance than in what might be termed straight chemistry or engineering. Reactions that cannot be foreseen through book or laboratory knowledge continually arise, stresses occur and changes in the physical property of materials become apparent which are not foreshadowed in engineering handbooks or taught in colleges.

In many phases of industry the chemical engineer eventually must play a determining part. As my experience increases, as I learn of and appreciate the new ideas and inventions that are evolved in ever-increasing number, I become more and more convinced of the great scope there is for improvement, even in our latest methods, and of the splendid prizes still to be won by the application of technical knowledge, imagination, and driving force to the daily problems of industry.

The basic need in industry is to get exact knowledge of what we are doing. Each process must be dissected, step by step; its yields, its losses, and its costs in material and labour must be made clear. With such knowledge available, it becomes possible to make improvements, to apply new methods, and even to develop fundamental changes to supersede hitherto accepted practice.

In all phases of industry the experience of the chemical engineer is of importance when dealing with stores. The suitability and the economics of lubricants, the wear and tear of wire ropes, timber, and other materials, are points where his specialized knowledge will show improved returns.

When we come to examine in detail the fuel industries, it is found that the work of the chemical engineer is of great importance. The cleaning of coal by either dry or wet processes, the efficient carbonization of coal, the preparation of oils from coal, the manufacture of pig iron, the manufacture of steel, and the heating of kilns and furnaces are all propositions wherein the specialized knowledge of the chemical engineer is needed. In the carbonization industries, for example, there are at the present day a number of problems requiring the work of chemical engineers. The preparation of satisfactory refractory materials with good jointing and patching cements to meet all reasonable temperature conditions, methods for rendering sulphate effluent innoxious, a method of liquid purification of gases from sulphur compounds, the manufacture of a dense, ash-free, easily-ignitable smokeless fuel, the preparation of a suitable cheap metal, presumably iron, which will stand up under working conditions of (say) 750° C. for a thousand days, are typical problems which require solution.

Or again, there is the problem of the preparation of oils from coal. Those of us who have followed the development of such processes as that invented by Bergius must realize the immense amount of work that has been done, but must also realize the immense amount of work that lies ahead in order to make the process truly economical. Numerous problems that arise are capable of solution only by close working between the laboratory and the works plant. Only by practical experience can the difficulties be discovered; only by a sound knowledge of chemistry and engineering can they be overcome.

Let us appreciate the necessity for chemical engineers in the fuel industries. Let us create the demand; I am sure it will be met. We must treat these men well. High salaries properly earned are a sound investment. In any of the operations I have mentioned, a good man can earn a good salary many times over.

A CHEMICAL STUDY OF LOW-TEMPERATURE TAR.

By Prof. G. T. MORGAN, F.R.S.

[ABSTRACT.]

The research under review has been in progress at the Chemical Research Laboratory, Teddington, since the beginning of 1926. The tars and tar distillates, which have been supplied in large quantities by H.M. Fuel Research Station, are representative products of low-temperature carbonization derived from two typical coals. The object of the research was to increase our knowledge of the original constituents of low-temperature tar. Since certain of these components undergo distinctive changes on heating, separation by solvents has been substituted for separation by distillation. In the solvent treatment the highest temperature employed did not exceed 120° C.

A tar treated in this way with such volatile solvents as ether, petroleum, and acetone left, after removing acidic and basic constituents and neutral oils, only 5·4 p.ct. of amorphous solid, whereas when fractionated by distillation under the ordinary pressure it gave 31 p.ct. of pitch.

Among the solid aromatic hydrocarbons, two homologues of anthracene have been identified—namely β-methylanthracene and 2 : 6-dimethylanthracene.

A preliminary study has been made of the more volatile bases; and the following have been identified: Aniline, α-picoline, 2 : 4-lutidine, *sym*-collidine, quinoline and quinaldine. The phenolic constituents and their chloro-derivatives have been examined in regard to both chemical and bacteriological properties.

By solvent methods of separation, the percentage yields of several potentially useful constituents of the tars have been notably increased. The waxes obtainable by ordinary methods of freezing out represent about 1·7 p.ct. of the tar. The yield of solid higher aromatic derivatives from undistilled tar is now 1·2 p.ct., and may be increased still further. The bases of low-temperature tar have been divided into two groups, volatile amines and resinamines. A method has been evolved for separating by a simple economic process the true phenols from their phenate soluble impurities. The phenols themselves have been separated into crystallizable phenols and amorphous resinols, both of which are likely to receive industrial application.

There was no discussion upon either paper; but on the motion of the CHAIRMAN, a hearty vote of thanks was accorded to Sir Arthur Duckham and Prof. Morgan.

Dr. SMITH, replying on behalf of Sir Arthur Duckham, said he was sure that he was expressing Sir Arthur's view definitely when he stated that the chemical engineer was one who was chiefly engaged in trying to make practicable such work as that described by Prof. Morgan. It must not be overlooked, however, that before the industrialists and the chemical engineer could start business at all, such work as that described by Prof. Morgan must be fully financed and encouraged, and he personally strongly deprecated any ill-considered judgment of the utility or otherwise of the work which was being carried out by recognized competent experimentalists.

Prof. MORGAN also acknowledged the vote of thanks; and on the motion of Mr. F. H. CARR (President of the Society of Chemical Industry) a hearty vote of thanks was passed to Sir Hugo Hirst for presiding.

DINNER.

There was a dinner on Monday, May 14, at the Connaught Rooms, when Mr. F. H. CARR presided. After the Loyal Toasts had been honoured, he expressed regret at the absence of the President of the Board of Trade (Sir Philip Cunliffe-Lister, K.B.E.), and called upon Mr. Herbert G. Williams (Parliamentary Secretary to the Board of Trade), who had attended to take Sir Philip's place.

Mr. HERBERT G. WILLIAMS, proposing "The British Chemical Industry" said that to-day he was satisfied there was a real commercial opening for the first-class scientifically trained chemist. In the early days, when speaking of chemistry, one naturally thought of Germany, but to-day one thought of Great Britain. He was convinced that the petrol tax of this year would prove to be of the greatest benefit to the country as a whole, if only for the reason that home-made benzole was free of this duty.

Sir ALFRED MOND, who made the first reply to the toast, said he believed that generally there was little to complain of in the British chemical industry to-day; and the development was going on so rapidly that when he was asked to build new works he was almost afraid to do so, for fear that they would be obsolete before they were completed. As to the petrol tax, he thought this would have a far-reaching effect as regarded the utilization of coal in this country in a liquid form. Those who had had to study closely and follow what was happening in this matter knew that already very great progress had been made on the technical side of the liquefaction of coal. From the point of view of the country and the Empire, the question of producing oil from coal was one of the most vital and important problems which had been presented for a great many years, second only—if second it was—to the production of synthetic nitrogen, which was one of the key defence industries of the country. As a result of the research work carried out during the year, a plant had been established at Billingham; and one thing which could be said was that if ever this country was again involved in war, it would be entirely independent of any outside sources of high explosives. Oil was a very similar problem. During the war we had had to import, at very great risks, large quantities of oil; but the problem of producing oil from coal was now in the way of being solved, and the encouragement of the petrol duty would help that solution very considerably. Indeed, instead of being an importing country of oil we should, at no distant date, become, not perhaps an exporting country, but at any rate a self-contained country as far as oil fuel was concerned. There was in this country scientific engineering and financial capacity sufficient to develop all new ideas; and he felt certain that a new era was opening for the British chemical industry, which marked the beginnings of very great things, many of which he himself would not see completed.

Sir DAVID MILNE-WATSON, who also replied, said he understood the conference had been arranged largely as a reply to certain remarks made by Lord Balfour in the Messel Lecture to the Society some two years ago, in which he compared unfavourably what Great Britain was doing on the scientific side of industry with what was being done by foreign countries. He could not help feeling that to a certain extent these remarks were another example of the typically English attitude of magnifying foreign attainments and disparaging their own. When, however, they looked at the whole field of industry they found much with which to console themselves. On an occasion such as that, it would be out of place to go into great detail; but he would like to give a few instances which led him to think that Lord Balfour did little justice to British industry. Take, for example, the new industry based upon high-pressure gas reactions—dependent as they were to a marked degree upon a knowledge of the technique of high-pressure apparatus generally. To a certain extent they might be considered as the natural developments of work carried out twenty years ago in Carlsruhe upon the synthesis of ammonia. While great credit must be given to Haber for the chemical conception of that work, a very considerable share of credit was due to his English associate, Le Rossignol, for the part he played in overcoming the difficulties associated with the handling of gases under high pressure. The solution of those difficulties rendered possible, not only the establishment of the synthetic ammonia industry;

but also of some of the other synthetic fuel processes. It might be claimed that, in respect of synthetic ammonia, the enterprise of the English firm whose head was Sir Alfred Mond had practically placed this country in a position of equality, and recent visits to Germany and to Billingham led to the conclusion that Sir Alfred Mond need have no fear of any comparisons which might be made. Take another industry—the artificial silk industry—but for the work of two English chemists, Cross and Bevon, it was inconceivable that this industry would be occupying the position of importance which it did to-day. Another instance was the manufacure of special steels for the engineering industry. This was an essentially English industry, based upon the work of English chemists. It had its natural home in Sheffield; and the scientific and development work had had important and far-reaching consequences. For example, the superiority of certain English electrical apparatus might be ascribed to the discovery of special cobalt steels and to their magnetic properties.

The Gas Industry.

The industry with which he had the honour to be connected—the gas industry—was essentially English, or Scotch. It began in this country; and throughout its history there was no doubt it had maintained a position of technical leadership. This, in recent years, had been largely due to the efforts of the chemists who were engaged in that industry; and it was likely, to judge from what had been taking place, that the gas industry would become more and more a chemical industry as time went on. It was said that the prosperity of a country might be measured in terms of its output of sulphuric acid; but it was clear that this could no longer be true. There had been a shifting of the centre of gravity; and, as Lord Balfour had stated, it was now largely based upon coal, air, and water. It might be said that in the present age the prosperity of a country was to be measured in terms of its output of carbon monoxide and hydrogen, rather than in terms of sulphuric acid. The carbon was derived from coal, the oxygen from either air or water, and the hydrogen from either water or coal. The realization of the part played by coal, air, and water, or by carbon monoxide and hydrogen, gave one a new viewpoint which extended considerably the horizon of the carbonizing industry. As to low-temperature carbonization, it might be stated that the gas industry had adopted and developed a high-temperature process, not because of any prejudice against the adoption of lower temperatures, but simply because it had appeared that only by the use of high temperatures was it possible to discharge their statutory obligations to supply the public with gas at the lowest possible price. It was obvious that if any process of low-temperature carbonization could be established upon a sound economic basis there were many advantages of national importance; and it was considerations such as these which had led his Company to erect the low-temperature unit which was being installed at Richmond. In this connection, however, further chemical research would be necessary in order to discover new markets for the liquid products of the process, since these products differed in a marked degree from the liquid products of the high-temperature process. In no other industry had the advantage of chemical control been recognized more fully during the past few years than in the gas industry; and the steady increase in the efficiency of gas production had undoubtedly been due to the large increase in the number of chemists employed by gas undertakings. A natural result of this kind of control was that the industry was looking more and more to the research and investigations of chemists in order that its processes might be developed to give still more economic working in the future. The chief matter for consideration at the present time was the development work which lay between the discovery of the scientist and the establishment of a process on an economic scale. The gas industry had taken its full share in this kind of investigation work. For over twenty years The Institution of Gas Engineers had carried out co-operative research work at the University of Leeds; and a professorship was established through the instrumentality of the industry. Taking everything into consideration, the British chemical industry was at the present moment doing its full share in the work of solving industrial problems in this country.

The final toast was "The Chairman," proposed by Sir Alexander Gibb (President of the Institution of Chemical Engineers), and briefly responded to by Mr. Carr.

[Further notes on the proceedings are reserved for subsequent publication.]

UNIFORMITY IN COMPOSITION OF STRAIGHT COAL GAS.

By Norton H. Humphrys.

In the first place, it is necessary to fix on a definite meaning for this qualification, because it is conventionally and somewhat loosely applied as a distinction from "mixed" gas as produced by the aid of a second and separate process, and also includes what is really a mixed gas obtained by the introduction of steam or other extraneous matter into the coal gas retort. A strict sense of the word indicates the pure and unmixed products from coal alone, and as such it will be used in the following remarks. A glance at the accompanying table will show that the only samples conforming closely to this requirement are Nos. 1 and 2.

The probable explanation is that these samples were generated in an iron retort perhaps made in one piece, which was practically gastight, and, if not worked under pressure, at least worked without any important extent of vacuum. Since iron has given place to fireclay or silica, and the one piece to one or perhaps two mouthpieces attached by means of cement joints (or built up in several parts or blocks, which are by no means gastight when new, and in course of time develop cracks and fissures, frequently to an extent that brings their working life to a premature close), the make of gas has been increased by the addition of matters that were not present in the coal. For reasons presently to be considered, this dilution has been accepted with indifference, if not with complacency, by the profession. Air is drawn in through unsound joints or defects on the exterior of the setting, and furnace gases enter through cracks or fissures in the body of the retort. On the whole, there is no great reason for gratitude to these additions. Under the 1920 Act, they do not add anything worth mentioning to the saleable value of the gas; but they do add proportionate cost to nearly the whole of the subsequent treatment. At the best they are a clumsy and objectionable method of dilution. Their specific gravity is about double that of the combustibles, and carbon dioxide is prejudicial in other ways.

The saleable value of the gas is now for the most part proportioned to the therm content; but the expenses of dealing with it are almost entirely proportioned to the bulk. From the outlet on the retort to the several burners in the district, the sizes of the various appliances are determined by the volume of gas to be passed, rather than by the quality. The only exception is the fact that enlargements of mains and services can be avoided by increasing the distribution pressures with the aid of secondary mechanical power; but the necessary accessories to this course can neither be provided nor operated free of cost. A complete manufacturing, purifying, and distributing plant, of dimensions suitable for the efficient handling of 100 million c.ft. of gas of a quality of 600 B.Th.U. per c.ft., will not extend a similar efficiency to more than an equal volume of 300 B.Th.U., though the thermal value is only one-half. The advocates of long-distance transmission of electricity should be able to show that manufacture on a gigantic scale will give a reduction in cost of production that is more than sufficient to offset the increased costs of distribution. In like manner the advocates of low-quality gas should be prepared to show that the saving in manufacture per therm—not per 1000 c.ft.—is greater than the increased cost of manufacturing, condensing, purifying, storing, distributing, and measuring the larger quantity of gas. The cost of appliances of all kinds is influenced by their size; and the size must be proportioned to the volume of gas concerned.

The difficulties of securing complete combustion of undiluted gas may be set against the objections to leaky—not to say fractured—retorts. But a different, and in some respects a more satisfactory, state of affairs would be possible if a return to gastight retorts was feasible—if clay or silica vessels could be coated with enamel, or a metallic compound could be discovered which would be capable of resisting the high temperature common to modern carbonization; together with burners that would completely consume, under every-day conditions, gases of the values shown in Col. 18. Or, if preferred, the quality could be brought down by addition of blue gas in suitable proportions.

So-Called High Makes.

Some of the high makes, classified as straight coal gas, would take less astounding positions if corrected for extraneous additions, whether combustible or incombustible. The only addition that passes through the retort unchanged is nitrogen. Oxygen, combustibles contained in the furnace gases, and carbon dioxide are all subject to secondary reactions. Oxygen usually disappears as such, and may go to assist thermal value in the form of carbon monoxide, or to reduce it by converting combustibles into carbon dioxide or water vapour—thus either adding saleable constituent to the gas, or increasing the troubles due to large quantities of weak ammoniacal liquor. Some analyses show as much as nearly 1 p.ct., or even 1½ p.ct., of free oxygen, which does not seem compatible with the presence of thirty times as much hydrogen and twenty times as much methane, and suggests that this excess was admitted at the cold end of the retort, or at a subsequent stage.

Internal combustion is attended by a loss of therms, so far as the gas is concerned. One pound of hydrogen thus removed means a loss of nearly two-thirds of a therm, and one pound of carbon about one-seventh. Perhaps the heat thus abstracted from the gas is usefully applied for maintaining carbonizing temperature; but in that case the value of the abstraction is reduced from the current price of gas to about one penny, which may be taken as the therm value of coke.

Coal will not contribute more than about 1 p.ct. of nitrogen as expressed in terms of the weight carbonized, and 22·4 lbs. represents about 300 c.ft.—say, 2 p.ct. on a make of 15,000 c.ft.,

The Composition of "Straight" Coal Gas.

—	—	(1)	H_2. (2)	H_4C. (3)	H_2C_2. (4)	CO. (5)	CO_2. (6)	N_2. (7)	O_2. (8)	Combustibles. (9)	Inconbustibles. (10)	Observed Cal. Val. (11)	Calculated Cal. Val. (12)	Sp. Gr. (13)	H_2. (14)	H_4C. (15)	H_2C_2. (16)	CO. (17)	Cal. Value. (18)	H_2 and CO. (19)	H_4C. (20)	H_2C_2. (21)	P.Ct. H_2C_2. (22)
1	Frankland, E., Royal Institution, 1853		51·8	35·2	3·5	9·0	..	0·4	0·1	99·5	0·5	624	652	..	52·1	35·4	3·5	9·0	627	195	353	79	2215
2	" "		47·6	41·5	3·1	7·3	0·5	..	..	99·5	0·5	657	669	..	47·8	41·7	3·1	7·4	660	177	416	67	2190
3	Humpidge (Coste, "Calorific Power of Coal Gas," p. 90), 1876		50·6	34·5	4·1	7·0	0·6	3·2	0·6	96·2	3·8	621	633	..	52·6	35·9	4·3	7·2	645	198	358	95	2336
4	Frankland, P. (Gas Light and Coke Company), 1883		48·0	37·6	4·4	3·8	..	5·9	0·3	93·8	6·2	641	654	..	51·2	40·1	4·7	4·0	683	177	400	106	2356
5	Wilson, C. (London), 1889		50·4	37·3	3·8	4·0	0·5	4·0	Incl. CO_2	95·5	4·5	..	643	..	52·9	39·2	4·0	3·9	673	182	591	100	2513
6	" "		50·9	37·0	4·0	4·6	0·4	3·1	"	96·0	3·4	..	651	..	52·8	38·3	4·2	4·7	674	184	383	107	2571
7	Wright, Lewis T., 1883, J.S.C.I., 1883, p. 504		48·3	39·6	5·2	4·6	..	2·3	..	97·7	2·3	..	697	..	49·5	40·5	5·3	4·7	714	173	404	137	2570
8	Coste, "Calorific Power of Coal Gas," p. 94, 1909		46·7	31·5	3·6	7·4	2·9	7·7	0·2	89·3	10·7	569	560	..	52·3	35·4	4·0	7·3	638	194	353	91	2275
9	Institution of Gas Engineers' Transactions, p. 172, 1919		44·8	38·1	3·5	6·8	2·1	4·5	0·2	93·2	6·8	626	635	0·431	48·1	40·9	3·7	7·3	671	177	408	86	2320
10	" " p. 70, 1918		38·7	26·0	3·1	12·4	3·5	17·7	1·8	77·0	23·0	499	471	0·533	50·3	29·6	4·0	16·1	649	219	295	142	3225
11	" " p. 29, "		40·5	31·2	3·2	11·7	3·7	13·5	1·4	81·4	18·6	503	511	0·519	49·8	31·9	3·9	14·4	618	205	318	95	2436
12	" " p. 69, "		37·9	31·5	2·9	10·3	6·8	10·3	0·3	82·6	17·4	559	543	0·535	45·9	38·2	3·5	12·4	677	187	381	109	3113
13	" " p. 324, 1919		49·5	28·5	2·3	10·3	2·2	6·8	0·4	90·6	9·4	544	557	0·440	54·7	31·5	2·0	11·2	600	211	314	75	2498
14	Kempe's Engineer's Year Book, p. 2389, 1927		49·0	27·0	4·0	9·0	2·5	8·5	..	89·0	11·0	550	567	0·440	55·1	30·4	4·5	10·0	618	208	304	106	2355

The Composition of "Mixed" Coal Gas.

15	Alwyne Meade, "Modern Gas-Works Practice," p. 495, 1916		44·0	22·0	5·8	16·5	3·5	8·0	0·2	88·3	11·7	583	563	..	49·8	24·9	6·6	18·7	660	219	249	192	2920
16	Institution of Gas Engineers' Transactions (13 p.ct. steam), p. 324, 1919		49·5	23·5	1·8	13·8	3·3	7·5	0·6	88·6	11·4	482	484	0·460	55·9	26·5	2·0	15·6	544	229	264	51	2536
17	" " " (22 " "), p. 317, 1925		48·9	19·0	1·8	16·4	3·6	9·4	0·9	86·1	13·9	447	438	0·460	56·6	22·2	2·1	19·1	519	242	222	55	2600
18	" " " (14 " "), p. 317, 1925		51·5	18·6	1·5	17·6	4·6	5·7	0·5	89·2	10·8	463	456	..	57·7	20·9	1·7	19·7	511	248	209	54	3041
19	" " " (13 " "), "		51·3	19·6	1·2	17·4	3·6	6·5	0·4	89·5	10·5	470	446	..	57·4	21·9	1·3	19·4	521	246	219	56	4383
20	Poulson, J., "GAS JOURNAL," April 4, 1928 (average of 19 samples), 1928		48·2	21·9	2·1	15·2	4·8	7·1	0·7	87·4	12·6	465	475	0·471	55·2	25·1	2·4	17·3	539	232	250	57	2375

or 1½ p.ct. on 20,000 c.ft. The excess over this quantity is not more than an approximate indication of the air and furnace gases admitted, because the latter may not have entirely undergone complete combustion, and may contain, in addition to carbon dioxide and some excess of oxygen, small quantities of hydrogen, carbon monoxide, and possibly methane.

A straight coal gas, in the ordinary sense of the word, is a diluted gas of some higher value. The qualities set out in Col. 11 are really the values shown in Col 18, diluted with incombustibles to the extent exhibited in Col. 10. The quality of a pure straight coal gas is seen to be not less than 600, and frequently nearer 700 B.Th.U., and a mixed gas, rarely less than 500. A lower quality has been diluted either with blue gas or with incombustibles.

Effect of Steaming.

Inflow of extraneous matters is assured by the now common practice of applying a liberal amount of steam to the vertical type of retort, as the quantity of nitrogen in the gas is invariably increased in sympathy with the percentage of steam admitted. It is generally known that there is a difference between the pressure at the top and that at the base, and that a level gauge at the outlet may be attended by an appreciable vacuum at the other end. Admission of air will take place when the bottom lid is removed for withdrawal of coke, to a greater extent than is possible with horizontal retorts.

High and low temperature gases are sometimes spoken of as being separate and distinct in constitution; but the former, as manufactured in the usual manner, is never free from a considerable proportion of the latter, because the gas is of necessity taken off from the cooler end of the retort. With intermittent charging, the whole body does not attain a "high temperature" until two to four hours after entering the retort; and where the continuous system is used, there is an unceasing flow of coal that is not likely to attain a "high temperature" until after several minutes have elapsed. Endeavours to meet this objection have not proved a commercial success. In King's Treatise, Vol I., p. 178, will be found an illustrated description of "Lowe's reciprocating process," which consisted of charging each half of a through or double retort at equal intervals, instead of at one and the same time. There was the usual dip pipe at each end, with the addition of a cup and lever, by which it could be sealed; and after a fresh charge had been put in, the hydraulic main was closed at that end. The freshly made gas was thus compelled to traverse the entire length occupied by a half-spent and presumably hot charge. With the aid of modern stoking machinery, by which the retorts could be nearly completely filled with coke, this process offers facility for the use of steam. The obvious difficulties in dealing with the drawing and charging under the conditions above stated explain why a process which on the face of it carries prospect of improved results in the shape of more gas and less tar has not been more extensively adopted. The late Mr. T. Settle had similar ideas in connection with intermittent charging and vertical retorts. A genuine high-temperature gas would probably consist chiefly of hydrogen and carbon monoxide, approximating to blue gas; the other constituents in an average sample, as shown in the table, being produced at temperatures below about 1000° C. As much is evidenced by the fact that the hydrocarbon content (Cols. 15 and 16) shows a steady diminution from the top to the bottom, probably coincident with more even and increasing working temperatures.

A table showing the composition of twenty samples of gas is attached, covering the period 1853 to 1927. The reports of the Fuel Research Board include a large number of analyses, but this valuable source is not drawn on; the present objective being samples of gas, preferably covering large volumes, as supplied to the public. Cols. 2 to 8 show the analyses as published, but for the sake of simplicity the second decimal figure is omitted. Next follow the proportions of combustibles and incombustibles, and then the calorific values. Col. 11 shows the observed value, and is given preference in all cases where it is obtainable. An approximation, useful for comparative purposes, can be calculated from the analysis, on the basis of the well-known values for hydrogen, methane, and carbon monoxide, and an assumed value for the heavy hydrocarbons, which in this case is taken as eight times that of hydrogen—2560 B.Th.U.—in order to arrive at the figures stated in Col. 12. As a means of putting the several samples on an even basis, Cols. 14 to 18 are devoted to the combustibles only, which are of special interest to undertakings working under the 1920 Act, as being the only parts that are paid for. The values of the heavy hydrocarbons are shown by difference in Col. 22. They possess the remarkable feature that no two quantities agree; and there is a remarkable difference between some of them. One explanation is that the constituent recorded as methane also includes higher members of the paraffin series of hydrocarbons in small quantities.

The strong family likeness between gases produced from a large variety of material, and under very diverse working conditions, is evident. Hydrogen does not stray far from 50 p.ct., and with a few exceptions methane favours 35 to 40 p.ct. Carbon monoxide shows wide variations, for which different sorts of coal are probably responsible, but does not exceed 9 p.ct., except in Nos. 10 to 14, which are obviously the results of a strong pull at the exhauster. The total values of the com-

bustibles only range from 600 to 714, and synchronize with the heavy hydrocarbon content, showing that, though these compounds are no longer indispensable as light-producers, their calorific value is by no means to be despised. Even in the lowest number they contribute 12½ p.ct. to the total. Cols. 19 to 21 are an analysis of the totals shown in Col. 18; the hydrogen and carbon monoxide being combined, as being of practically equal value. Though they constitute the bulk of the gas—sometimes more than 90 p.ct.—their contribution to calorific value is a much lower proportion, and is affected by the heavy hydrocarbons. In No. 7 (5·3 p.ct. H_xC_x) it is only 2·4 p.ct.; but in No. 13 (2·6 p.ct.) it is 35 p.ct. Methane takes an important part, especially in the earlier numbers. In No. 2 it amounts to no less than 63 p.ct. of the whole.

USE OF INCOMBUSTIBLES.

In 1853, Dr. E. Frankland brought a charge against straight coal gas, on account of its high calorific value (the only factor now thought to be worth paying for). The point was that a mixed gas, containing more hydrogen and carbon monoxide, and less methane, consumed in an open burner (at that time the only known means for development of illuminating power), absorbed less oxygen and evolved less heat, per unit of lighting value. Some kind of diluent was needed on account of the liability of rich gas to give off smoke and products of incomplete combustion under any disturbing cause such as a draught of cold air or contact with cold metal; but he objected to the use of incombustibles as likely to cool the flame and consequently to reduce the illuminating power. He appeared to regard methane as a blue gas, which subsequent research proved to be incorrect, in line with hydrogen and carbon monoxide, and mentioned that it consumes four times as much oxygen and gives off three times as much heat as equal volumes of either hydrogen or carbon monoxide. Of the two, he expressed a preference for hydrogen as the ideal diluent, because it did not yield any poisonous products of combustion. At that time, and for many years after, carbon dioxide was regarded as a powerful poison. The poisonous character of carbon monoxide, which has more than once been exploited by our competitors, does not seem to have attracted his attention.

The objections to incombustibles are not avoided by the discarding of the flat-flame type of burner; and the modern preference for mixed gas supports the soundness of the contention. Smoky ceilings have not been in such prominent evidence since the general adoption of the incandescent burner, but the highest possible flame temperature is essential to the most efficient results. The bunsen burner will not entrain more than a fixed quantity of air, dependent on volume and pressure; and the larger the proportion of primary air, in terms of the total air requirement for complete combustion, the better is the efficiency. The flame is smaller, hotter, and less likely to disturbance by the above-named causes.

The heavy hydrocarbons range from 2·6 to 5·3 p.ct., and their contribution to the calorific value ranges from 75 to 137 B.Th.U. The liability to incomplete combustion, for which they are chiefly responsible, necessitates a diluted gas. The modern practice lies in the direction of 450 B.Th.U. and a limit of about 2 p.ct. (See Nos. 16 to 20.) Some authorities favour dilution or reduction of calorific value to an extent that practically puts this class out of court.

SECONDARY DECOMPOSITION.

Dealing with straight coal gas, it would appear that a large part of the advantages gained by higher and more even temperatures of carbonization, mechanical charging, and other modern refinements, is offset by increase of secondary reactions resulting in simpler forms of constituents, attended with separation of carbon in solid form, the calorific value of which is lost so far as the gas is concerned. Makes exceeding 10,000 c.ft. per ton of 650 B.Th.U. (calculated) were not uncommon before the end of the last century, even in small works, showing an approach to 70 therms per ton; and among the immense amount of interesting matter placed before the North British Association of Gas Managers by Mr. H. H. Gracie, in the course of his Presidential Address (see *ante*, p. 169, *et seq.*), attention may be directed to the makes and qualities of gas supplied in Edinburgh during the last forty years, which warrant a similar conclusion.

The composition of a gas as shown by analysis of a fair average sample drawn from a distributing main in the district differs in other respects from the original than the bare removal of impurities. The extraction of ammonia and sulphur compounds is practically complete, but 4 to 7 p.ct. of carbon dioxide is allowed to go forward with the gas, because no practical and efficient means of removal are known. On account of its solubility in water and combination with ammonia, however, the percentage is reduced, perhaps to the extent of 30 p.ct. or more. So a 6 p.ct. on the analysis may mean more like 10 p.ct. at the outlet from the retort. A common practice is admission of air in measured quantities at the purifier inlet, for revivification *in situ*. The entire excess of nitrogen thus added, together with any excess of oxygen, goes forward with the gas. If the declared value is low, as much as 5 p.ct. of air may be admitted at this point, affording some explanation of a high nitrogen content, and also of the presence of free oxygen as already noticed. Under modern conditions, the heavy hydrocarbons are not likely to be affected.

A few samples of mixed gases are added by way of comparison. The hydrogen content is not affected so much as might be expected, but there is a remarkable decrease in methane, the effects of which are evident in Col. 20; the contribution to calorific value falling from 63 to 40 p.ct. A decrease in the assistance afforded by the heavy hydrocarbons is also noticeable. The chief feature is the increase in carbon monoxide, which exceeds 10 p.ct. By theory, steaming should produce equal volumes of hydrogen and carbon monoxide, but where does the equivalent of hydrogen go to? The first may be slightly increased by the addition of furnace gases, but the reduction in methane should be attended by an important addition to the free hydrogen.

MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.

Visit to the Biscuit Factory of Messrs. W. & R. Jacob & Co., at Aintree.

The Association visited the Aintree Biscuit Factory of Messrs. Jacob & Co. on May 9, and on arrival were received by Mr. Hogarth, on behalf of the Directors. During their tour through the factory, the visitors were highly interested in the coal-gas fired ovens. The dough enters the oven on a travelling tray conveyor, and continues to travel all the time it is in the oven. On its exit, the biscuit is completely baked, and after cooling is ready for packing. At the conclusion of the tour, Capt. Jacob joined the party in the works canteen, and extended to the visitors a hearty welcome. After tea, the following paper was presented.

THE EFFECT ON THE GAS-MAKING VALUE OF GAS OIL OF ITS PREVIOUS USE FOR THE REMOVAL OF NAPHTHALENE FROM COAL GAS.

[A Thesis submitted for the Institution Diploma, 1926.]

By HAROLD H. THOMAS, B.Sc., of the Liverpool Gas Company.

The presence of naphthalene in coal gas has always been a source of worry and expense to the gas engineer. In recent years its presence has been felt rather more than previously, owing to the decreased "naphthalene-carrying" capacity of the gas distributed by the majority of the undertakings in this country. This reduction was particularly noticeable during the war period, when the light hydrocarbons were removed from the gas. The problem must be attacked and remedied before the gas passes to the district. The vaporization of light oils into the gas will in many cases meet with a measure of success, but the extremities of the district may still be liable to the trouble. The removal of the naphthalene from the gas on the works is the only permanent solution of freedom from stoppages.

The methods available for the removal of naphthalene do not admit of a very wide choice. The provision of large condensing capacity must be eliminated, as the removal could not be complete, and, in addition, an increased quantity of light hydrocarbons would be condensed from the gas if efficient naphthalene removal was attempted. There remains the method of washing the gas, in suitable apparatus, with some medium in which the naphthalene is soluble. The gas oil fraction of petroleum which is used in the gas industry for the enrichment of blue water gas has been found to be an efficient medium for use in this connection. Works which do not manufacture carburetted water gas should use anthracene oil in place of gas oil. The spent anthracene oil may be steam distilled or can be run to the tar well. Spent gas oil must not be added to the tar, owing to its tendency to precipitate free carbon from the tar, which will cause the latter to assume a "lumpy" consistency and also retain water.

The washing process is carried out in a rotary brush washer of the counter-flow type. The volume of oil used depends on the naphthalene content of the gas, the naphthalene solubility figure of the oil, and the physical conditions under which the process is carried out. This figure may be as low as 11 gallons per million c.ft. of gas completely free from naphthalene.

If the spent oil is to be returned to the water gas plant, the effect of this process on the gas-making qualities of the oil is of importance when considering its adoption on any particular works. The properties of the spent oil will depend on the conditions under which the washing is carried out. Such factors as the temperatures of the gas and oil in the washer, the volume of oil used, and the method of manufacture of the gas (*i.e.*, horizontal or vertical retorts or water gas) will have varying effects on the composition of the spent wash-oil.

This examination was made on an American gas oil which

had been used in a Holmes' rotary brush washer (erected for naphthalene removal) on gas from horizontal retorts; the washer being between the purifiers and the station meter. The naphthalene content of the gas at the inlet to the washer was about 4·5 grains per 100 c.ft. This is a low figure, and is due to the atmospheric conditions being such as to remove a considerable portion of the naphthalene in the earlier parts of the plant. The washed gas was free from naphthalene. During the period over which the sample was taken, the oil used was 15·3 gallons per million c.ft. of gas washed.

Heavy oil has been largely employed for the removal of benzene and its homologues from coal gas. In this process the proportion removed is not sufficient to affect the calorific value of the gas to an appreciable extent, owing to the small quantity of oil used.

Assume the whole of the light oils removed to be benzene—
= 1·71 galls. per million c.ft. (see later).
Calorific value of benzene vapour = 4043 B.Th.U. per c.ft.
Weight of benzene removed = 1·7 × 0 885 × 10 = 15·13 lbs.
22·4 c.ft. benzene vapour = 78 ozs. (Mol.Wt.)

$$\therefore 15{\cdot}13 \text{ lbs.} = \frac{15{\cdot}13 \times 16 \times 22{\cdot}4}{78} = 69{\cdot}5 \text{ c.ft.}$$

Thermal value of benzene removed = 69·5 × 4043 = 280,988 B.Th.U.
= 0·28 B.Th.U. per c.ft.
Confirmation of this is obtained in a more simple manner.
Calorific value of benzene = 163,000 B.Th.U. per gallon.
∴ Total heat units removed from 1 million c.ft. of gas = 163,000 × 1·71
= 278,730 B.Th.U. = 0·278 B.Th.U. per c.ft.

By measurement of the volume of oil entering and leaving the washer, it was found that the increase in volume due to the absorption of light hydrocarbons and naphthalene was 1·71 gallons per million c.ft. of gas. This is very small compared with that obtained in the benzole process; but as the total volume of oil used was only 15·3 gallons per million, this volume of light hydrocarbons has a considerable effect on the distillation range of the oil.

Distillation Test.

Fraction, P.Ct.	Unused Oil.	Spent Oil.
10	—221° C.	—150° C.
20	221°—233°	150°—167°
30	233°—240°	167°—191°
40	240°—247°	191°—214°
50	247°—254°	214°—235°
60	254°—262°	235°—252°
70	262°—272°	252°—266°
80	272°—285°	266°—285°

These figures show that there has been an appreciable lowering of the distillation range of the oil.

A further indication of the extent to which the light hydrocarbons are absorbed is obtained from a comparison of the specific gravity and flash-point of the new and the spent oils.

	Specific Gravity.	Flash Point.
Unused oil	0·8709	76° C.
Spent oil	0·8804	Inflammable

The flash point must be considered when discussing the use of the spent oil in the water gas plant. Liquids with "open" flash-point below 72° Fahr. (22° C.) are considered dangerous; and special precautions must be taken to ensure their safety in use.

In this case the oil was highly inflammable at air temperature. It is possible that, in certain cases, the conditions in the washer may be such that the flash-point of the spent oil is above the dangerous limit. For this and other reasons to be mentioned, the spent oil is always mixed with four volumes of unused oil before being sent to the water gas plant. The open flash-point of the mixture was 56° C.

The spent oil consisted of approximately 90 p.ct. of gas oil with 10 p.ct. of light hydrocarbons as determined by the increase in volume of the oil passed through the washer. The naphthalene content of the spent oil was 4·54 grammes per 100 c.c. The presence of a small amount of naphthalene in the oil fed to the carburettors is of little consequence, as naphthalene is formed in considerable quantity during the cracking of gas oil, and the carburetted water gas is usually saturated at the temperature of the condenser outlet. The Gas Investigation Committee, in the Seventh Report, discussing a high naphthalene content in water gas, suggest that the gas may be carrying naphthalene in the form of a cloud, in addition to that sufficient to saturate it and present as true vapour. For this reason the presence of naphthalene in the spent oil will not affect the amount present in the purified water gas.

The next point to be determined is "the potential gas-making value of the spent oil from the naphthalene washer as an enriching medium for blue water gas." The oil is a mixture of gas oil and benzene hydrocarbons. Some valuable information on the effect of high temperatures on the aromatic hydrocarbons is given by Dufton and Cobb in a paper read before The Institution of Gas Engineers. Their results indicate that the gas-making value of the aromatic hydrocarbons in the spent oil will be small. They passed benzene and toluene vapours, separately and in various atmospheres, over heated coke. As a result of the experiments they state: "In an inert atmosphere, benzene commences to undergo molecular condensation at a temperature of 500° C., with the elimination of hydrogen and the formation of diphenyl.

$$2\,C_6H_6 \rightleftharpoons C_6H_5 - C_6H_5 + H_2.$$

"At 750° C. the action is much more extensive and complex, for, in addition, compounds such as diphenyl benzene are produced. At 920° C. free carbon is formed. The primary condensation to diphenyl is a balanced action and proved reversible. With dilution with hydrogen, benzene is stable at 800° C. Toluene, similarly treated, undergoes molecular condensation at 550° C.; at 750° C. the action is more complex, the main product being an oil (B.P. 265°—275° C.). As in the case of benzene, hydrogen minimized the condensation; it reduced toluene to benzene and methane. This reduction is also a balanced action and was proved reversible."

The effect of an increase in the hydrogen concentration in the gas is important, for it decreases the decomposition of the benzene at temperatures up to 800° C. In the water gas plant the high percentage of hydrogen will be beneficial in this respect, but there seems to be no possibility of the evolution of volumes of high-grade gas. Judged from the above results the gas formed from the aromatic hydrocarbons will be benzene or similar vapour, and, in the event of their decomposition, a small volume of hydrogen from benzene or methane in the case of toluene.

The method used for the laboratory comparison of the actual gas-making value of the unused and spent oils was the one described by Ross and Leather and used by them in an investigation of the gas-making value of oils from various sources. The conditions of the test must be carefully defined and adhered to, when the results obtained will be of value for comparative purposes.

The apparatus consists of a ⊓-shaped cast-iron "cracking" chamber (6 in. by 14 in.) heated in an ordinary muffle furnace. This chamber is filled with broken refractory material, in order to increase the heat capacity and also present a large surface for the decomposition of the oil (this is the only alteration in the apparatus as described by Ross and Leather). The front of the chamber is fitted with three tubes. The first is closed and passes to the centre carrying a thermo-couple for the determination of the temperature; the second is the oil inlet passing only a short distance into the retort; and the third is the gas outlet from the back of the retort. This arrangement ensures that the oil vapour has been subjected to the temperature effect for a sufficient period for its conversion into gas.

When the apparatus is at the required temperature, 10 c.c. of the oil is passed into the chamber at a constant rate during five minutes. The gas formed passes through a tower filled with glass wool, which removes the tar, to a glass gasholder. The water is removed from the holder at a rate sufficient to maintain atmospheric pressure in the retort. The gas evolved is collected for a period of 10 minutes—that is, for five minutes after the oil to the retort has been stopped. The gas formed equals the volume of water which has been removed from the holder; and this figure multiplied by the hydrocarbon content of the gas (determined by absorption with bromine), and divided by 10, is the gas-making factor per c.c. of oil at the particular temperature used.

Examined in this apparatus, the unused and spent oils gave the following results:

Temperature.		New Oil.			Spent Oil.		
° Fahr.	° C.	Vol. of Gas. C.C.	Hydro-carbons. P.Ct.	Factor.	Vol. of Gas. C.C.	Hydro-carbons. P.Ct.	Factor.
1229	665	4876	21·05	10,264	3656	20 9	7641
1319	715	4855	19·05	9,249	3865	16 0	6184
1400	760	5732	13·5	7,738	4935	11·45	5646
1454	790	5682	12·7	7,216	5025	9 7	4874

The final figure showing the gas-making factor of the spent oil is greatly inferior to that of the new oil over the range of temperatures used. The oil gas formed is not only inferior in quality, but the volume is considerably less than that obtained from the new oil. Whether these results would be reproduced on the plant is debatable, and, although there is no doubt that the spent oil is inferior in gas-making quality, the extent of this inferiority is probably over-emphasized by the figures obtained above.

Considering the researches of Dufton and Cobb, their results show the marked effect of the "atmosphere" on the decomposition of benzene vapour. They state that benzene is staple at 800° C. in the presence of hydrogen. The high percentage of hydrogen in water gas would, therefore, be expected to improve the gas-making quality of an oil containing benzene, by preventing the decomposition and causing the vapour to be caried forward with the gas. In the laboratory apparatus, the concentration of hydrogen is small; and condensation of the benzene forming diphenyl and hydrogen may occur. To this extent the laboratory apparatus fails to reproduce the actual conditions in the water gas plant.

A further paper giving results of interest on this subject is the one mentioned by Ross and Leather.

These investigators concluded that:

(1) The open chain compounds have the highest value for gas making purposes.

(2) The presence of double bonds in the chain decreases the value slightly.

(3) The presence of one or more rings decreases the value considerably.

(4) The more fully hydrogenated the ring, the better its value as compared with other ring compounds.

(5) Benzene rings have practically no value for gas-making purposes.

Conclusion (5) is significant. Thus we must conclude the only way in which use can be made of the benzene present in the spent oil is that it shall pass through the plant and be present in the carburetted water gas vapour.

Toluene and the higher members of the series must now be considered separately. Conclusion (4) states that the more fully hydrogenated the ring, the greater is its value. In the case of toluene, the carbon atom of the methyl group forming the side chain is saturated, and we may expect that toluene will be of greater value than benzene for gas-making purposes. This theory is probably correct, for Dufton and Cobb found that toluene was reduced to benzene and methane in the presence of hydrogen. Thus, there is evolved a small amount of methane from the condensation of toluene; and it is probable that increased volumes of methane are formed by the action of heat on xylenes in an atmosphere of hydrogen.

We now have further reason for mixing the spent oil with new oil before sending it to the water gas plant. The effect on the calorific value of the gas of one gallon of oil per 1000 c.ft. of gas made is approximately constant; and in order to keep this figure at its normal value, the spent oil is mixed with four times its volume of new oil.

Conditions might occur when it would be profitable to increase the volume of gas oil used in the washer in order to effect the complete removal of the benzene hydrocarbons from the gas. This is a distinct possibility on a gas-works where so much waste heat is available which, converted into steam, would materially reduce the cost of "debenzolizing" the wash-oil. Unfortunately we had no opportunity to obtain a sample of gas oil which had been so used, so that figures for the gas-making value of such an oil are not available.

The final comparison of the new and the spent oils was obtained from the results of two tests carried out on the water gas plant. The first test was made using a 4 : 1 mixture of new and spent oil in the carburettors, and the second using a new oil. The spent oil used in the first test was not obtained under any particular or observed conditions, and the sample examined was not representative of this oil. The spent oil used was a mixture of oils from naphthalene washers on the gas from vertical and horizontal retorts. The results are, however, sufficient to indicate the difference in the gas-making qualities of the two oils.

Tests on New Oil and on Gas Oil mixed with Spent Oil which had been Used for the Removal of Naphthalene from Coal Gas.

Oil used	Mixed {1 vol. spent / 4 vols. new	New.
Duration of test in hours	94·66 ..	72
Coke (dry) supplied to generator, tons	84·96 ..	72·13
Oil to carburettors, gallons at 60° Fahr.	8923 ..	6618
Total carburetted water gas made, c.ft. at 60° and 30° Fahr. saturated	4,995,000 ..	3,947,000
Coke to generators per 1000 c.ft. C.W.G., lbs.	38·1 ..	40·9
Oil to carburettors per 1000 c.ft. C.W.G., gallons	1·786 ..	1·676
Calorific value of C.W.G., B.Th.U. per c.ft. gross	429 ..	427
Ash in coke, p.ct. on dry coke	13·12 ..	15·29
Dry ash-free coke to generators per 1000 c.ft. C.W.G.	33 11 ..	34·67
Naphthalene content of gas at inlet to purifier, grains per 1000 c.ft.	11·2 ..	12·8
B.Th.U. to gas per gallon of oil to carburettors	102,180 ..	107,870

The figure showing the B.Th.U. to the mixed gas per gallon of oil to the carburettors, which is the figure of importance for our present purpose, was obtained as follows:

The assumptions made were:
(1) That the blue water gas forms 85 p.ct. of the mixed gas.
(2) That the calorific value of the blue water gas was 290 B.Th.U. per c.ft.

In the mixed oil test:

Therms per 1000 c.ft. carburetted water gas = 429 × 1000 ÷ 100,000 = 4·29

Therms per 850 c.ft. blue water gas = 290 × 850 ÷ 100,000 = 2·465

Therms from oil gas per 1000 c.ft. C.W.G. = 1·825

The oil used per 1000 c.ft. C.W.G. = 1·786 gallons.

∴ Therms to the mixed gas per gallon of oil = $\frac{1·825}{1·786}$ = 1·0218

From these figures the reduction in the gas-making value of the new oil may be calculated.

If we assume that the gas oil present in the mixed oil has the same gas-making value in each test.

Total B.Th.U. to gas per 5 gallons mixed oil = 102,180 × 5 = 510,900

" " " 4 " new oil (in mixed oil) = 107,870 × 4 = 431,480

and the difference between these two figures is "B.Th.U. to the gas per gallon of spent oil," = 79,420,

and the reduction in gas-making value

$$= \frac{(107,870 - 79,420)}{107,870} \times 100 = 26·4 \text{ p.ct.}$$

In conclusion we may say that, having decided to use gas oil as the medium for removing naphthalene from the gas, the spent oil may be used in the water gas plant with results inferior to those obtained with new gas oil.

The flash-point of the spent oil must be determined, and new oil must be added in such a proportion that will ensure the flash-point of the mixture being above 72° Fahr. The spent oil should not be run to the tar well, owing to the effect on the tar; and returning it to the water gas plant is the simplest, most obvious, and least expensive method of effecting its disposal.

Finally, I wish to express my thanks to Mr. R. E. Gibson, the Engineer of the Liverpool Gas Company, for his permission to use the figures included in this paper.

Vote of Thanks.

The President (Mr. Small) complimented the author upon his paper.

Mr. Bamber, B.Sc. (Bolton), in moving a vote of thanks to Mr. Thomas, said that the paper had given them a new aspect of naphthalene washing. It was not always easy to dispose of the spent wash oil at an economic price, and this suggested the possibility of utilizing the oil for carburetted water gas production.

Mr. Carter (Liverpool) seconded the vote, and Mr. Thomas briefly replied.

MIDLAND JUNIOR GAS ASSOCIATION.

Visit to the Apedale Works of the Midland Coal, Coke, and Iron Company, Ltd.

About 75 members of the Association paid a visit on Saturday, May 5, to the Apedale Works of the Midland Coal, Coke, and Iron Company, Ltd. On arrival at Stoke-on-Trent, the party were entertained at luncheon at the North Staffordshire Hotel by the Chairman and Directors of the Company.

The Chairman (Mr. W. M. Hill), in welcoming the visitors, said he thought they would be interested in the works, and particularly in the coal mine. They would notice that in places the coal seam was much inclined, and in parts vertical, and it was due to this that conditions were probably the most difficult in the country. Considerable resourcefulness was needed to overcome the peculiarity.

Mr. H. R. Hems (President), in thanking the Chairman and Directors for their hospitality and the opportunity of visiting the mine and works, said the members were pleased to be there. While the visit was essentially for students, owing to the comprehensive nature of the works, it would prove of interest to everyone, whether of the engineering, chemical, or distribution section of the gas industry.

Description of the Plant.

Coking and Bye-Product Plant.—This embraces the recovery of tar, ammonia, and benzole, the manufacture of sulphate of ammonia, and the distillation of tar. The ovens, 82 in number, are of the Simon-Carves regenerative type.

No. 1 Power Station (Coke Ovens).—This plant consists of four "National" 600 B.H.P. vertical four-crank eight-cylinder gas-driven generating sets and two Belliss 250 B.H.P. simple condensing steam-driven generating sets, with the necessary auxiliaries. The alternators are by the General Electric Company, Ltd. The surplus gas from the coke ovens is automatically controlled through boosters, purifiers, and gasholder by a system designed by the Company's staff, and now adopted as standard practice elsewhere. The gas engines are fitted with an original system (the device of the management) of crank-case ventilation, the power for which is supplied from the exhaust gases from the engines. It is entirely automatic. This arrangement prevents the accumulation of explosive mixtures, and reduces the oil consumption and the temperature of the crank case, at the same time improving the atmosphere of the building. The National Gas Engine Company have acquired the rights. Exhaust gas is also used for carbonating the circulating water, to prevent scale from forming on the internal surface of the water jackets.

No. 2 Power Station (Blast Furnaces).—This plant consists of three "National" 600 B.H.P. vertical four-crank eight-cylinder gas-driven sets, one British Westinghouse 1600 B.H.P. turbo blower, one British Westinghouse 500 KW. mixed pressure turbo alternator, and one 200 B.H.P. Belliss compressor, with the necessary auxiliaries. The gas engines operate by blast furnace gas cooled and cleaned by passing through a Halberg-Beth dry cleaning plant; the gas supply and pressure being automatically controlled. Two of the sets are coupled direct

to three-crank air compressors (an original idea of the management) supplying blast to the furnaces, and the third is direct coupled to a Bruce Peebles three-phase, 550 volt, 25 cycle, 375 KW. alternator with direct-coupled exciter. Continuous automatic recorders giving a 60-day chart are electrically driven from a master clock on the synchronal system as follows: Gas pressures (crude and cleaned), oil, water, and air pressures. A calorimeter records the gas values in B.Th.U. per c.ft. Special governor gas and air valves are fitted to the gas engines, which automatically control the mixture under varying load conditions. These require no adjustment from attendants. It is an idea of the management; and the rights have been acquired by the National Gas Engine Company.

The power stations are situated about 1000 yards apart, are electrically coupled together, and run in parallel; the power distribution to the pits and works being common to both.

Mining and smelting have been carried on in the Apedale Valley for over 200 years.

PARLIAMENTARY INTELLIGENCE.

SOUTH SUBURBAN AND DOVER COMPANIES' BILLS.

THE PRINCIPLE OF THE BASIC PRICE AND BASIC DIVIDEND.

Joint Committee of Both Houses—Tuesday, May 15.

(*Before Lord* CHALMERS (*Chairman*), *Lord* BERTIE OF THAME, *Sir* F. WATSON, *Major* ROPNER, *Lord* HENLEY, *Lord* CHARNWOOD, *Earl* DE LA WARR, *Mr.* MAITLAND, *Mr.* WALLHEAD, and *Mr.* E. BROWN.)

The purposes of the South Suburban Company's Bill are to consolidate the Company's Acts, to apply the basic price and basic dividend principle, &c. (see "JOURNAL" for Jan. 18, p. 152). The Dover Company's Bill includes provision for consolidation of capital, the raising of further capital, and the application of the basic price and dividend principle (see "JOURNAL" for Jan. 11, p. 91). The reference of the Bills to a Joint Committee of both Houses of Parliament arose out of a report by the Board of Trade containing certain criticisms of the basic price and dividend principle, which has already been accepted in nine Bills. There was no opposition in the ordinary way; but two Companies already operating under the basic price and dividend system petitioned against alterations to the South Suburban Bill.

The South Suburban Company were represented by Mr. W. E. TYLDESLEY JONES, K.C., Mr. F. G. WROTTESLEY, K.C., and Mr. JACQUES ABADY. Mr. ABADY also represented the Dover Company. There were petitions by the Commercial Gas Company (represented by the Hon. EVAN CHARTERIS, K.C.) and the South Metropolitan Gas Company (represented by Sir LYNDEN MACASSEY, K.C., and Mr. ROWAND HARKER, K.C.) against alterations to the South Suburban Bill.

The CHAIRMAN said he supposed Counsel were aware of the practice that representatives of Government Departments, when they appeared, were not cross-examined; but questions to elucidate facts could be put to them.

Mr. TYLDESLEY JONES replied that the practice in the two Houses of Parliament differed; but he was quite aware of it.

SOUTH SUBURBAN BILL.

Mr. TYLDESLEY JONES said the Bill was one to consolidate the existing enactments relating to the South Suburban Company; but it also proposed to effect an alteration in the law at present applicable to the Company, and to apply a new system of regulating prices and dividends—a system which was authorized by Parliament first in 1920 in the case of the South Metropolitan Gas Company, and since in a number of other Bills. There were nine of these Bills. The present Bill was not opposed in the ordinary way. Part of the Company's area was within the County of London. The London County Council had statutory rights to oppose and otherwise to interest itself in questions relating to gas supply in its area, and it was a very active body in that respect. It looked after the interests of the consumers; and in all cases since the war—and, indeed, long before the war—in which questions of price and dividend relating to London Gas Companies had come up for consideration, it had represented the interests of the consumers. In the present case its vigilance had not been absent. It had gone into the figures, and had ultimately agreed those which should be put into the Bill. Thus the figures in the Bill were the result of an investigation of the Company's affairs by the Council; and the Council, after full investigation, was satisfied with the Bill. The present Committee had been constituted, however, because the Board of Trade had certain criticisms to make on the basic price and basic dividend principle. Criticisms which the Board had put forward before it desired to urge again, and in consequence the House Authorities had asked Parliament to set up the Committee and to consider the principle of the basic system.

The South Suburban Gas Company was incorporated in 1858 under the name of the Crystal Palace District Gas Company. By subsequent Acts of Parliament its area of supply was extended, and at present included a very important part of London, and portions of Surrey and Kent adjoining the southern and south-eastern boundaries of London. The local authorities in whose areas the Company supplied (which included the London County Council and a number of Metropolitan Boroughs), and who were interested in this matter, were numerous and important. The Company had issued stock to the extent of £1,243,795, in respect of which it had obtained premiums amounting to £14,510, on which latter, of course, no dividends had to be paid. With regard to loan capital, it had issued 5 p.ct. perpetual debentures to the extent of £368,837, in respect of which it had obtained premiums amounting to £34,989. It had also issued 7 p.ct. redeemable debenture stock amounting to £101,200, making in total a capital, raised either by means of issuing stock or by premiums, of £1,763,000 odd. The immediate neighbour of the Company was the South Metropolitan Gas Company, whose area of supply adjoined.

HISTORY OF GAS CHARGES.

The question to be considered by the Committee was one of principle, bound up in the system which it was sought to apply to the South Suburban Company; and it was necessary, therefore, to go into the history of gas charges in this country. This question had in the past engaged the attention of a good many eminent persons. Discussions as to the principles to be applied had taken place in both Houses of Parliament; and those who had taken part in those discussions included Mr. Gladstone, Lord Salisbury, Mr. Wilberforce, and Mr. W. E. Foster, all of whom had played an important part in the evolution of the system of charging for gas. The first Gas Act was passed in 1810, authorizing a supply in London. In 1812 the Gas Light and Coke Company was incorporated by Royal Charter to carry the Act of 1810 into effect. Later other companies were incorporated by Acts of Parliament to supply gas in London, and, indeed, London was handed over to the gas companies as the plaything of competition. In every district in London there were at least two companies supplying. In some there were three, and in others four; and there was the keenest competition among them. The early Acts had left it to competition to regulate prices, and no limit was imposed as to what the companies could charge. The result was not very satisfactory. In course of time competition led to combination, and ultimately there was a districting by agreement between these companies; and that districting had ultimately to be accepted by Parliament as the solution of many of the difficulties which had arisen owing to promiscuous competition. In 1842 an Act was obtained by the South Metropolitan Gas Light and Coke Company, by which Act the dividend of that Company was limited to 10 p.ct. This was the first Act which limited the dividends of a gas company. At the same time, it had allowed the Company to set up a reserve fund. It did not limit price directly, but indirectly it did, because it provided that the Justices in Quarter Sessions might appoint accountants to look into the Company's affairs, and, if they found that the profits had on an average of three years exceeded 10 p.ct., the price to be charged by the Company in the future was to be reduced so as to give the Company 10 p.ct., and not more. That Act was followed by others containing similar provisions.

In 1847 Parliament passed the Gas-Works Clauses Consolidation Act, which consolidated into one Act the provisions that were usually inserted in the Special Acts of gas companies up to that date, so that it was only necessary in Private Acts to incorporate the provisions of the General Act. The provisions relating to dividends in the General Act were similar to those in the South Metropolitan Company's Act of 1842—namely, that there was to be a limitation of the Companies' dividend to 10 p.ct. The Companies were entitled to charge what they liked for gas; but if such charges resulted in larger profits than 10 p.ct. being made, they could be reduced by an Order of the Court of Quarter Sessions.

At this time there were many companies; but the bigger ones gradually absorbed the smaller, so that the number was gradually reduced, and by agreements they had parcelled-out London among themselves, and had eliminated competition. The abolition of competition, of course, had left the consumers largely at the mercy of the gas companies, and complaints were rife that something must be done to keep the companies in check. In 1860 there were thirteen Metropolitan gas companies; and there also existed a body which had no counterpart to-day—namely, the Gas Consumers' Protection Society—which was constituted to try to do something to check the charges and methods of supply of the companies. In that year a Bill was promoted which proposed to incorporate the Gas-Works Clauses Act of 1847, and so retain the 10 p.ct. maximum dividend; but it also fixed for all the London companies a maximum price of 4s. 6d. per 1000 c.ft. for common gas, as distinct from cannel gas (which latter is not now supplied), providing at the same time that the maximum price might be increased if the cost of production increased. The provisions of the new Act (the Metropolis Gas Act, 1860) were referred to in Mr. Rostron's book on "Powers of Charge of the Metropolitan Gas Companies." This arrangement, however, had not proved altogether satisfactory. Mr. Rostron, who had made a special study of the history of gas legislation with reference to price, had stated in his book that "The consumers complained that the gas companies had got all the benefits under the Act, while they" (the consumers) "had got nothing. The existing regulations were

a premium on extravagance and bad management, as a badly managed company got the same reward as a good one, while all the losses fell on the consumer. Under the existing system of accounts, the companies were able to throw everything on the consumer. Complaints were also made as to the illuminating power and quality of the gas supplied, and the machinery provided by the Metropolis Gas Act for enforcing its own regulations was said to be imperfect."

In 1868, as a result of the agitation which had taken place, the City of London Corporation promoted a Bill which when passed was known as the City of London Gas Act. This applied to the three Companies supplying the City—the Gas Light and Coke Company, the City of London Gas Light and Coke Company, and the Great Central Gas Consumers' Company. This Act repealed those parts of the 1860 Act relating to dividends and reserve fund so far as the City was concerned, and provided for a maximum dividend of 10 p.ct. on paid-up capital, and a maximum price of 3s. 9d. It also provided for a revision of price by three Commissioners whom the Board of Trade were empowered to appoint if the City Corporation or any of the Companies concerned applied for revision, such revision being made to enable the Companies to earn a dividend of 10 p.ct., provided they exercised "due care and management." In 1869 an Act was passed applying the same principles to the South Metropolitan Gas Company and the Imperial Gas Light and Coke Company; but the maximum price of the South Metropolitan Gas Company was fixed at 3s. 6d. per 1000 c.ft. This era in the history of gas legislation—providing for a revision of price by an outside body—had not been successful in practice. The South Suburban Company attached considerable importance to the earlier history of this matter, because experiments had been made from time to time, and had not been successful, and they now suggested that there should not be a repetition of what had proved to be a mistake in the past. In 1870 the Franco-Prussian war broke out; and one of its effects was to produce a coal famine in this country between 1872 and 1874. Not long ago, in connection with certain litigation, an official of the Ministry of Mines had sworn an affidavit, in which he had proved that the high prices and scarcity of coal in this country from 1872 to 1874 were directly traceable to the Franco-Prussian war. The Gas Light and Coke Company and the Imperial Company had been caught short of coal, and their costs had risen considerably. They applied to the Board of Trade for a revision of price. There was opposition by the City of London Corporation and by the Metropolitan Board of Works (the predecessors of the London County Council). The opposition to the Gas Light and Coke Company's petition was on the ground that the Company's inability to pay its full dividend was owing to want of care and management, in the following particulars: (1) Excessive and unnecessary expenditure of capital, (2) improvident contracts for the purchase of coal and the sale of residuals, (3) bad working of the retorts, and (4) excessive leakage. The fact that the South Metropolitan Gas Company had not applied for an increase of its maximum price was pointed to by the opposition as evidence of their contention; but the Commissioners had increased the maximum price of the Gas Light and Coke Company from 3s. 9d. to 4s. 4d., and as the result of a later application it was increased to 5s. The Imperial Company had obtained an increase of maximum price to 4s. 8d.

There was dissatisfaction with the system then in operation, because a company which had shown energy and efficiency, and which avoided an increase in price or effected a reduction, had no greater reward than a company which had not done so well. It could not be said that the Gas Light and Coke Company was wanting in due care and management, but it could be said that the South Metropolitan Company had displayed extra energy and efficiency. In 1875, therefore, the City of London Corporation and the Metropolitan Board of Works introduced a Bill, which was intended to apply to all the companies in London, including the City. This proposed that there should be a standard price of 3s. 9d., and that the companies should have the right to pay a maximum dividend of 10 p.ct.; but for every penny by which the price charged exceeded 3s. 9d. the dividend must be reduced by 5s. p.ct. below the 10 p.ct. There was no provision for increase of dividend with decrease of price. The Board of Trade wrote a letter which constituted an official condemnation of a system of revision by official Commissioners or Government Departments (which system had been tried and had failed), and suggested a sliding-scale, giving the companies the right to pay an increased dividend if the price of gas was reduced, as well as reducing the dividend if the price were increased. Sir (then Mr.) George Livesey, of the South Metropolitan Gas Company, was called by the local authorities to give evidence before a Committee of the House of Commons in favour of the Bill; but he advocated a sliding-scale such as was suggested by the Board of Trade. Ultimately the local authorities accepted the principle of the sliding-scale. Some of the companies, however, would not accept the principle, and in consequence the Bill was dropped. In 1875 the Commercial Gas Company voluntarily accepted the principle of the sliding-scale, and other companies in London adopted it subsequently. The history of the sliding-scale was unbroken from 1875 to 1914, when the great war broke out, and gas companies' costs were increased and dividends reduced (in some cases almost to vanishing point), while their stocks decreased in value. The Statutory Undertakings (Temporary Increase of Charges) Act was passed in 1918; and this was followed in 1920 by the Gas Regulation Act.

Basic Price System.

In that year Dr. Carpenter (President of the South Metropolitan Gas Company) came forward with the basic price system, which was introduced in a Bill promoted by his Company. That system was founded on what the Directors of the Company regarded as three essentials for the supply of cheap gas—namely, (1) cheap capital; (2) the utmost endeavour on the part of the management; and (3) the co-operation of the workmen employed. There was a great deal of scope for care and skill; and if the workmen could feel that there was some recognition of their efforts, they were willing to make those efforts. The scheme had made statutory provision for the workmen; and it had been completely successful in the case of the South Metropolitan Company, who had applied it for seven years. In the Company's Act of 1920 the basic dividend on new capital was fixed at 6 p.ct., and on existing capital at 5 p.ct. The basic price for gas was 11d. per therm. At the end of each year or half-year a calculation was made of the revenue derived from consumers at the current price of gas (if that were below the basic price), and the revenue which would have been derived from them if gas had been supplied at the basic price. The difference between those two figures represented the actual amount by which the consumers had benefited by reason of the decreased price of gas below the basic price, and that difference was called the consumers' benefit. Then, "if there were sufficient money in the coffers of the Company," an amount equal to one-sixth the amount of the consumers' benefit could be applied to increase of dividend, and another one-sixth to the co-partnership fund, in which the working co-partners participated, to provide additional wages over and above the standard wages. An important point about the scheme was that it secured by Statute to the workpeople employed a share in the benefit resulting from the reduction of costs. Also, it was an improvement on the sliding-scale, which scale had been found so defective, in that there was danger in abnormal times, of considerable reduction of dividend, with the consequence that new capital became much more expensive. In 1926 the Gas Light and Coke Company secured an Act which provided a minimum dividend of 5 p.ct., though the sliding-scale was retained in other respects, and the principle of the minimum dividend was not objected to by the Board of Trade.

The Chairman asked in how many cases that principle had been applied.

Mr. Tyldesley Jones said he did not know how many other companies had got it; but the principle had been accepted.

Lord Charnwood asked if there had been any Bill promoted since 1926 in which the principle could have been introduced, but was not introduced.

Mr. Tyldesley Jones said there had not; and he was glad to say that, according to the Board of Trade report, the Board of Trade had no objection to it. The only case in which the principle of putting a minimum dividend to the sliding-scale had been applied was that of the Gas Light and Coke Company; but the principle of a minimum dividend, which was embodied in the basic price system, and was inherent in it, had been accepted by Parliament in nine Bills. He was informed also that a modified minimum dividend had been accepted in Special Orders made by the Board of Trade. With regard to the basic price system, he pointed out that the shareholders received an increased dividend, and the co-partners received a bonus, only after the consumers had benefited by a reduction in the price of gas, and then only if there was sufficient money. This was an important consideration. Ever since the South Metropolitan Company had applied the scheme they had not had sufficient profits remaining, after the consumers had benefited, to pay the full increases of dividend or the full bonuses to the co-partners that they were entitled to pay. The South Metropolitan Gas Company had, in fact, kept its prices below the level which would yield the greatest return to the shareholders. When the South Metropolitan Company's Bill was promoted in 1920, the Board of Trade reported that it was proposed at an early day to introduce a Public Bill dealing with the matters with which the Company's Bill was concerned; and in the circumstances it was suggested that it was inexpedient to proceed with the Company's Bill in so far as it related to those matters. The Public Bill referred to was the Gas Regulation Bill, which was subsequently passed. The Company's Bill was opposed by the London County Council, the City Corporation, and a number of Metropolitan Boroughs; but the Bill was passed, a provision being inserted which made it obligatory upon the Company to promote another Bill in 1925, to propose a revision of the basic price provisions or to give an opportunity for revision to be made. Consequently, the Company promoted another Bill in 1925, to give an opportunity for revision. That was opposed only by the London County Council, who asked that the basic price should be reduced below 11d. (which was fixed in 1920), and that the Board of Trade should have power to revise the basic price from time to time. The Council did not ask for abolition of the basic system; and Parliament had not reduced it. The Company objected to revision by the Board of Trade, and urged that it should be made only by Parliament. The Bill was passed, and a provision was inserted to the effect that the Company must promote another Bill ten years later to give an opportunity for the ground of the basic price to be revised. The important thing was that the local authorities in the area of supply, after having had experience of the basic system, had not asked for its abolition.

Wednesday.

Practically the whole of Wednesday was devoted by Mr. Tyldesley Jones to the remainder of his opening speech on behalf of the South Suburban Company. He commenced by reviewing the circumstances in connection with Bills promoted after 1920 which sought to apply the basic price and dividend principle, following its application to the South Metropolitan Company.

In 1921, he said, Bills were promoted for this purpose by the Cardiff and the Swansea Gas Companies. Both these Bills were opposed; but there was no report by the Board of Trade against the principle, and both were passed. In the case of the Swansea Company, they had made an application to the Board of Trade for revision of their price under the General Act of 1920, and the figures were before the Board of Trade, so that the Board were left to settle the basic price to be fixed by the Bill. The Cardiff Company had voluntarily accepted a provision that the Board of Trade should have power to revise their basic price.

The Chairman asked whether this provision was inserted on the proposition of the Board. Counsel replied that it was not.

In the 1922 session, continued Counsel, three Bills were promoted in which the basic system was proposed. One was promoted by the Chester Gas Company, and in that case there was no report from

the Board of Trade. The Chester Corporation had opposed the Bill; but figures were agreed between the Company and the Corporation, the opposition was withdrawn, and by agreement a clause was inserted enabling the Board of Trade to revise the basic price either by increase or reduction. The Sheffield Gas Company had promoted a similar Bill, in respect of which also there was no report by the Board of Trade. The Bill was opposed by the Sheffield Corporation, the Sheffield Chamber of Commerce and Manufacturers, and the Gas Consumers' Association. Subject to certain modifications which were agreed upon between the promoters and the opponents, the opposition was withdrawn during the first day's hearing of the Bill in Committee, and the Bill was passed. The opponents had proposed a clause providing for revision of the basic price by the Board of Trade, and that was accepted by the Company.

Mr. WALLHEAD (a member of the Committee) asked if provision was made in each case for the workers to share in the surplus profits.

COUNSEL said that the workers' share was provided for in each case, and was an essential part of the system.

Another Bill, promoted by the Windsor Royal Gas Company, was unopposed. The Board of Trade had made a report, suggesting that Parliament should satisfy itself that the principle of a basic price and a basic rate of dividend was one which in the case of this Company offered advantages to the consumers and the shareholders which could not be secured either by the then existing provisions or by the adoption of a sliding-scale of the usual kind. The Board were not in a position, on the information at their disposal, to express an opinion as to the amount at which the basic price should be fixed, but *prima facie* the price of 16d. per therm proposed in the Bill was excessive, inasmuch as it was substantially higher than the highest price which the Company had found it necessary to charge during recent years, while at the same time they had been able to pay the maximum rate of dividend. It was also observed that the effect of the adoption of the principle of a basic price and basic rate of dividend would in the case of this Company enable them to increase their rates of dividends above the maximum rates at that time authorized by approximately five-sixths p.ct. for each penny per therm by which the selling price was less than the basic price. Thus, the Board had raised the question of the principle, at all events as regards this Company. The Unopposed Committee of the House of Commons had left it to the Board of Trade to fix a fair basic price; but the principle was accepted by the Committee.

In 1924 a Bill was promoted by the Rhymney and Aber Valley Gas Company, which proposed to apply the basic system. This Company manufactured no gas itself, but bought it from coke-oven undertakings and distributed it. The Bill was strenuously opposed by all the local authorities in the Company's district. The Board of Trade had suggested that before the new system was authorized in that case the Committee considering the Bill should be fully satisfied by evidence as to the advantages which would accrue to the Company and the consumers through its adoption, and as to the practical working of the system in the cases in which it had been authorized. Thus, there was a direct challenge by the Board of Trade to the system.

Major ROPNER (a member of the Committee) asked on what grounds the application of the system had been opposed by local authorities.

COUNSEL said there were different grounds in different cases, and he would obtain the information with regard to the various cases. In the case of the Rhymney and Aber Valley Company's Bill there was objection to the system being applied at all, and objection also as to the figures proposed.

Major ROPNER said he gathered that the local authorities were watching the interests of the consumers, and he wanted to know the objections from the consumers' point of view. He presumed the local authorities were suspicious that the price of gas would be increased.

COUNSEL pointed out that under the basic system an increase of price would not help the Company to pay bigger dividends.

Major ROPNER said that might be so, but he wanted to know the facts.

COUNSEL said that one objection taken by the opponents of the principle was that it provided for an increase of dividends, but did not provide for a decrease of dividends below the minimum. In the Rhymney and Aber Valley case, Mr. H. C. Honey (then Director of Gas Administration at the Board of Trade) had expressed to the Committee the Board's views on the system. In their decision the Committee had stated that they were not prepared to rule-out on principle the basic or minimum dividend system as though it were essentially inapplicable to any public undertaking; but in the circumstances of this Company and in the face of the strong opposition of all the districts affected, the Committee were of opinion that the system should not be imposed in that case. That was the only instance in which the system had been proposed to Parliament and rejected. It was not rejected on the merits of the system, however, but as being inapplicable to the particular Company concerned, and having regard to the opposition of all the local authorities.

Mr. WALLHEAD asked if any question had been raised as to the effect of the system on the wages of the workmen.

COUNSEL said he had no recollection of that. One of the advantages of the system was that the workmen shared in the benefits, but in the case of the Rhymney and Aber Valley Company the gas was bought in bulk, and the men employed in making the gas were not employees of the Company. Therefore, one of the strong inducements to careful working could not be operated in that case.

In 1925 Parliament had applied the basic system to electricity supply. There had been serious complaints of the prices being charged for electricity in London, which complaints still persisted. With a view to decreasing prices, the London County Council had made an agreement with the Companies, and had accepted the basic system as a basis for the future regulation of electricity prices and dividends in London, and the system was embodied in two Electricity Acts in 1925. It was impossible to say that a principle which had received such approval as this had not been accepted.

In 1927 Bills were promoted by the Commercial and the Scarborough Gas Companies in which the application of the basic system was proposed. When the principle was first introduced in London, the London County Council had been a strong opponent. The Council had always kept its finger on the pulse of gas matters in London, and had always taken a very active part in watching, criticizing, and when necessary opposing any legislation which it thought would be detrimental to the gas consumers. Therefore, the attitude of the Council to the Commercial Company's Bill was indicative of the success or failure of the system. It had agreed with the Commercial Company the figures to be inserted in the Bill; and it was agreed to insert a provision that the Company should promote a Bill five years later in order to give Parliament an opportunity of revision, if necessary.

The Board of Trade had presented a report on the Bill, in which it was suggested that the Company might keep the price to the ordinary consumers at the basic price level, or even above it, and, by means of granting excessive discounts to large consumers, reduce the average selling price of gas over the whole mass of consumers, so as to show (on paper) a substantial consumers' benefit, and pay an increased benefit. Theoretically, said Counsel, that was possible, but commercially it was not. The Bill was passed, but the Company agreed a clause with the Board of Trade with a view to meeting the point. This provided that the Company should from time to time file for public inspection with the local authorities and the Board of Trade statements of the conditions under which they were prepared to grant discounts, and any discounts granted by the Company should be alike in like circumstances. It was also provided that no sum should be divided in excess of the basic rate of dividend or carried to reserve fund, or paid to the co-partners, in respect of any period in which the price charged to the ordinary consumer was more than a halfpenny per therm in excess of the basic price. The South Suburban Company had inserted that clause in the present Bill because it was inserted in the Commercial Company's Bill; but at the same time the view of the former Company was that in no case could they commercially divide any sum in excess of the basic dividend unless they were selling gas at below the basic price, not only to the big consumers but even to the ordinary consumers. The Company were prepared to go further than the Commercial Company, and to accept a provision that no sum should be divided in dividend above the basic dividend or paid to the co-partners in respect of any period in which the price charged to the ordinary consumer was " equal to or in excess of " the basic price.

Mr. J. F. RONCA (Director of Gas Administration at the Board of Trade) said that in the case of the Commercial Company's Bill the Board of Trade had proposed the insertion of a clause in the terms now suggested by Counsel. It had been pointed out by the Commercial Company, however, that as the result of negotiations the local authorities had beaten them down a halfpenny per therm in their basic price, and, in order not to hit the Company twice, the Board had agreed to a margin of a halfpenny above the basic price.

COUNSEL said that the South Suburban Company were prepared to accept a clause such as he had suggested, which meant that they could not pay increased dividends unless the ordinary consumer was supplied with gas at less than the basic price.

Mr. MAITLAND (a member of the Committee) supposed Counsel would not suggest that the basic price to be fixed now should apply for all time.

COUNSEL said there was a provision in the Bill to the effect that the South Suburban Company must promote another Bill not later than 1933, suggesting a revision of the basic price or giving an opportunity for revision. In any case, the Company were bound to come to Parliament from time to time in the ordinary way, and on any such occasion Parliament would have power to say that the basic price should be revised.

Mr. WALLHEAD presumed that the basic price was based largely on the present price of coal.

COUNSEL replied that that was one of the factors, as were also the cost of labour and materials, and the selling price of residuals. The latter was a very important factor, and if the oil imported into this country could be excluded and the residual products from gas-works used for driving motor-cars, he supposed gas would be very cheap.

Mr. WALLHEAD suggested that the gas companies would probably be helped by the new tax on petrol.

COUNSEL agreed that they would to some extent.

The Bill promoted in 1927 by the Scarborough Gas Company was dealt with in the same way as the Commercial Company's Bill, and a similar clause with regard to discounts was inserted.

Dealing with the present Bill, Mr. TYLDESLEY JONES said that the areas of the South Suburban and the South Metropolitan Companies adjoined. The two Companies had always been closely associated, and since 1893 they had had power to amalgamate. The Directors of the South Metropolitan Company were also Directors of the South Suburban Company. The South Metropolitan Company having obtained power to apply the basic price system, the South Suburban Company had decided to ask that it should have similar power, for there were advantages which would inure to these Companies in the way of making amalgamation feasible. It was obvious that if the two Companies co-existed with separate bases of charge they could not be amalgamated. The South Suburban Company operated a co-partnership scheme, but on quite a different basis from that of the South Metropolitan Company, and the workers of the South Suburban Company had not statutory rights. There was no immediate proposal for amalgamation, but it was a likely thing; and if the two Companies were operating on similar bases, amalgamation could be effected easily. The South Suburban Company, however, asked for the application of this system on its merits; and the London County Council had agreed, subject to the Company reducing the proposed basic price from 11¼d. to 11d. per therm. The basic dividend proposed was 5½ p.ct.

The CHAIRMAN said the basic price of the South Metropolitan Company was 11d.

COUNSEL pointed out that the area of the South Suburban Com-

pany was more sparsely populated than that of the South Metropolitan Company. He added that the latter were promoting a Bill in Parliament this session, by which the dividend of 6 p.ct. authorized in 1920 on the new capital was to be reduced to 5 p.ct., so as to avoid having two classes of capital. No 6 p.ct. capital had been issued by the Company.

In the preliminary report of the Board of Trade on the present Bill it was stated that the Board, entertaining grave doubts as to the desirability of extending the application of the basic price system of regulating gas prices, had referred the matter to the National Fuel and Power Committee, who had been asked to report at an early date on (1) the principle of the basic price system of regulating the price of gas; and (2) the desirability or otherwise, in the national interest, of extending among gas undertakers the use of this particular system. The doubts entertained by the Board as to the basic price system arose from (1) the consideration that the system of itself appeared to afford no protection to the small consumer as against the large consumer, because the price of gas whereby the dividend payable was determined was not the price of gas to the ordinary consumer but the arithmetic mean of all prices; (2) the fact that the system as operated might offer inducements to undertakers to increase the price of gas rather than diminish it. In view of this the Board suggested it was desirable that consideration of the Bill should be deferred pending a further report from the Department after the receipt of the report from the National Fuel and Power Committee. The promoters of the Bill, said Counsel, strongly objected to this course. The National Fuel and Power Committee were appointed by the Board of Trade to consider and advise on questions connected with the economic use of fuels and their conversion into various forms of energy, having regard to the national and industrial requirements and in the light of technical developments. It was an admirable Committee for the consideration of such technical questions; but, with the greatest deference to the Board of Trade, he suggested that the Committee were not a suitable body to consider and review the decisions of Parliament. The system of charging for gas was one which Parliament had always kept under its control, and it was not a matter which Parliament was going to relegate to a Research Committee.

Sir F. Watson said he gathered that the Board of Trade were asking for a report from an expert Committee, on which to form an opinion.

Counsel agreed, but said it was proposed that the Bill should be held up meanwhile. To this the Company had objected, and Parliament had not adopted the Board's suggestion. In reply to Mr. Wallhead, he said the suggestion had now been dropped. The Board had subsequently submitted a further report.

Counsel then dealt with the working of the Gas Regulation Act. The effect of this was to produce permanent instability of prices. The Act was administered admirably; it was the system of the Act to which the Company objected. When costs increased, the London Companies went to the Board of Trade for an increase of their standard prices, and later on there came a request from the London County Council for those standard prices to be reduced again. He compared the working of the South Metropolitan Gas Company, under the basic system, with that of other London Companies, under the provisions of the General Act, and said that for most of the time the standard prices of the other Companies were higher than the basic price of the South Metropolitan Company, and the consumers of the other Companies had always had to pay more for their gas than the consumers of the South Metropolitan Company. In 1925 the Gas Light and Coke Company had applied for an increase of their standard price, but had not obtained the Order authorizing that increase until six months after the application was made. During that time costs had risen and the price of gas had increased, but the standard price had remained the same; and, through no fault of their own, the Company had had to reduce dividends, which resulted in a reduction of the value of the Company's stock. All this destroyed confidence. In order to raise money cheaply, there must be stability and security.

Mr. Wallhead asked if there were not the same delay also when the London County Council applied for a reduction of the standard price.

Counsel agreed, but said that what happened was that during that period the price of gas was reduced, because it was to the advantage of the Company to reduce it. Therefore the consumer benefited, and the only person who was hit was the shareholder. When the Gas Light and Coke Company had secured a minimum dividend, the difficulty had been overcome.

Dealing with the second report of the Board of Trade on the South Suburban Company's Bill, he said it was stated that when Parliament, in 1920, had settled the basic principle and fixed certain figures in the case of the South Metropolitan Company, it could not have had in mind that the South Metropolitan Company would be giving a bulk supply to the South Suburban Company. An agreement had now been made for such a bulk supply—to be given, of course, at a price below that charged to the ordinary consumers in the South Metropolitan Company's area. It was suggested that Parliament had not contemplated that the South Metropolitan Company might supply a large quantity of gas at a low price and so bring down the average price charged to all its consumers, and give an opportunity for increased dividend. The answer to this was that the dividend paid depended upon the price charged to the consumers of gas in the South Metropolitan Company's area; the South Suburban Company was not a consumer. Until the point was raised by the Board of Trade, nobody had ever thought that the South Suburban Company would be regarded as a consumer, and in his view the South Metropolitan Company's Act did not contemplate it. If there were the slightest doubt about it, he was prepared to make it absolutely plain in the present Bill that gas supplied to another gas company was not gas supplied to a consumer.

Sir F. Watson asked if he would be prepared to provide that the dividend should depend on the price of gas to the domestic consumer.

Counsel replied that he would not, because the industrial consumer, who was very important, would then be cut out.

In reply to Mr. Maitland, he said that for the purpose of arriving at the dividend which could be paid by the South Metropolitan Company, the amount received from the South Suburban Company in respect of the bulk supply would be disregarded.

Mr. Brown remarked that the supply of gas to another company might mean more profit.

Counsel agreed, and said it might go into the coffers of the Company and help the Company to reduce their costs; but the price charged for the bulk supply must be excluded from the calculation of dividends.

Mr. Wallhead said that the South Metropolitan Company, in their own area of supply, were the producers and the retailers, but in the South Suburban Company's area they would be wholesalers. What became of the wholesalers' profits?

Counsel replied that the bulk supply would enable the South Metroplitan Company to reduce the cost of manufacture of the whole of their gas, because standing charges would be spread over a larger quantity of gas, and the consumers in the area could be supplied at a lower price, so that they would benefit.

As to the Board of Trade suggestion that a low average price might be obtained by giving large discounts to big consumers, notwithstanding that the price to the ordinary consumers was high, he pointed out that in fixing a standard price even under the sliding-scale, the fact that discounts had to be given to large consumers was taken into account. The London County Council had worked out that the discounts which the South Suburban Company might be expected to give large consumers would represent a farthing per therm over the whole quantity supplied. Thus, what had been suggested by the Board of Trade was absolutely impossible in commercial practice. The Company would not pay a dividend above the basic dividend if the price to the ordinary consumer was equal to, or in excess of, the basic price. As an additional safeguard, the Company were willing to assent to a provision that the discounts to be taken into account in working the formula were not to exceed a halfpenny per therm on the whole quantity supplied. The amount of gas supplied by the Company to ordinary consumers in 1927 was 16,088,000 therms; the amount supplied for industrial purposes, and subject to discount, was 1,782,000 therms; and the amount for public lighting, on which there was a substantial discount, was 494,000 therms. The total gas supplied was 18,365,000 therms, about 11 p.ct. of which was supplied to the larger consumers. Thus, the great bulk of the supply was given for ordinary private purposes, and the Company could not make a big reduction in the average price of gas by keeping up the price to the bulk of the consumers and lowering the price to those who consumed a very small proportion of the total supply.

The Board of Trade's third point—that under the basic system there was an inducement to raise the price of gas—had puzzled him. Apparently the Board had in mind that the South Metropolitan Company had charged such a low price that they had not sufficient revenue to pay the dividend they were legally entitled to pay, and, therefore, that there was an inducement to raise the price and get a better dividend. That was a complaint that the Company had charged too little to give the best results from the shareholders' point of view. That could be done under the sliding-scale; but nobody had yet said that the sliding-scale was objectionable for that reason. It was stated, in the Board of Trade report, that the basic system in practice, and reviewed on the results of an examination of the only figures available, authorized the payment of dividends in excess not only of those in fact paid, but in excess of the monies available for the payment of dividends, so that it held out an inducement to increase the average price of gas in order to secure the money to pay the dividends authorized. The Board said it might be submitted that this was not a criticism of the system as such, but was merely an objection made possible because the predetermined basic price and basic dividend had been determined so as to favour the undertakers. Such a submission, the Board suggested, was far from complete, in that the liability to error in predetermining a basic price and its corresponding basic dividend was necessarily much greater than it was in prescribing a standard price and a standard dividend for the sliding-scale system. The basis in each case, Mr. Tyldesley Jones pointed out, was the same, but Parliament had fixed a basic price considerably lower than the standard price under the sliding-scale fixed by the Board of Trade. In the sliding-scale system, stated the report, a company's past accounts and the known comparatively steady increase in gas supplied to ordinary consumers afforded reasonably reliable data upon which to forecast a suitable standard price corresponding to a standard dividend. In the basic system, however, it could not in any case be expected that the rate of increase in the consumption by special-price consumers would follow such a steady law as did the rate of increase in that of ordinary consumers; neither were the discounts known which would be allowed in special circumstances. The advent of new special-price or discount consumers was necessarily so largely within the control of the Company, or was dependent so much on circumstances special to individual potential consumers, that no outside authority could hope to secure a reasonably correct forecast of the future growth in consumption by discount consumers. If this were true, said Counsel, every single standard price which had been settled for the sliding-scale had been settled without sufficient data. In fixing a standard price, the sales to big consumers who were allowed discounts had to be considered. By way of illustration of the difficulty of forecasting data for a basic price system, the case of the South Metropolitan Company was cited by the Board of Trade. When the Company's Bill was going through the Committee stage, one of the most cogent reasons adduced in support of the basic system by its sponsors was that the old sliding-scale (which had admittedly operated so well from 1876) broke down under the stress of war conditions. The extent of the failure was indicated by representing that shareholders in the Company received in the six years following the outbreak of war £580,000 less than they would have received at the pre-war rate of dividend, and but for the Statu-

tory Undertakings (Temporary Increase of Charges) Act this sum would have been £651,000. The basic price schemes substituted in place of this failure authorized in the peace years 1921 to 1927 the distribution of dividends of £586,679 in excess of the profits available for dividend, or £491,183 in excess of what the Company had in fact paid. These sums, it was noted, would have been substantially greater but for the coal strike of 1921 and 1926.

COUNSEL said that the futility of the Board of Trade observations lay in this—that every single word would have been applicable to the sliding-scale.

Lord CHARNWOOD asked if the application of the basic system to the South Metropolitan Company had increased the benefits received by the co-partners as compared with the benefits received by them previously.

COUNSEL said he did not know, but a comparison would have to be made of the benefits they had received under the basic price and sliding-scale systems; he emphasized, however, the value of their being given a statutory right to their share. The co-partners now held stock to the value of over half-a-million pounds in the Company, and there were three co-partner Directors on the Board. The Committee would not be asked, of course, to pass anything to the detriment of the consumers in the interests of the workmen. It was because the basic system had the effect of producing good work from the employees that the consumers benefited.

Dr. *C. Carpenter* (President of the South Metropolitan Company and Chairman of the South Suburban Company) gave evidence in support of the Bill, and said that as a result of a reduction of dividends under the sliding-scale under war conditions, the value of the South Metropolitan Company's stock had been reduced by about half.

The CHAIRMAN asked what were the main objections to the sliding-scale.

Dr. *Carpenter* said that one of the disadvantages was that there was not the same inducement to extend the uses of gas as there was under the basic system, because with the sliding-scale a point was reached eventually where there was no advantage to the shareholder in extending the use of gas.

Mr. JACQUES ABADY (Counsel for the promoters) said that under the sliding-scale the dividend was based on the price of gas to the ordinary domestic consumer. He asked if it was correct to say that there was not a great inducement to obtain contracts for large supplies of gas which could only be obtained by charging lower prices than that charged to the ordinary consumer.

Dr. *Carpenter* said that was so.

Mr. ABADY said that by supplying large quantities of gas to large consumers at a discount, the all-round cost of gas could be reduced.

Dr. *Carpenter* replied that the load line in London had changed very materially since the sliding-scale was first started. The difficulty to-day was to maintain an adequate pressure during one or two hours on Sunday mornings. If one could utilize the mains, which had been put in for a supply which lasted for only an hour or two during the week, to supply a manufacturer during the working hours of each day, one was enabled in the long run to supply at a lower rate the smaller consumers, who would be otherwise very uneconomical and costly customers. With regard to co-partnership, he said that when the employees had seen the dividends on their stock decrease almost to vanishing point, and their bonuses disappearing, they began to be suspicious of the sliding-scale and the arrangements associated with it. Even to the last, the sliding-scale system was not wholly understood by a great many people, and certainly it was not understood by a large number of the employees. Under the basic system the employees had a definite share of surplus profits, and the system could be understood by all. He had also been assured by the men over and over again of the importance they attached to the advantage of having a statutory right to a share of the surplus profits, such as was provided for by the basic system.

Asked by the Chairman whether the effect upon the value of the Company's stock was a primary consideration in proposing the basic system, Dr Carpenter said it was one of the main considerations, because there had been very great difficulty in increasing gas capital. In 1914, gas investments were popular; but later the investors had begun to shy, because it was found that the investments had not the certainty which they were previously believed to have.

The Committee then adjourned until Thursday.

Thursday.

After hearing the remainder of the Company's case and a statement by Mr. J. F. Ronca on the Board of Trade report, the Committee accepted the adoption of the basic principle for the purposes of the Bill. They agreed to the basic price of 11d. per therm, but decided that the basic dividend should be 5 p.ct., instead of 5½ p.ct., as originally proposed in the Bill.

A full report of the day's proceedings will appear in next week's issue of the "JOURNAL."

HOUSE OF LORDS.

Progress of Bills.

Dover Gas Bill: Reported from the Joint Committee without amendment, and re-committed.

South Metropolitan Gas Bill: Returned from the Commons, with the amendment, agreed to.

Ormskirk District Gas Order: Referred to the Special Order Committee.

HOUSE OF COMMONS.

Progress of Bills.

South Suburban Gas Bill: Reported, with amendments, from the Joint Committee.

Windermere Gas and Water Bill: As amended, considered; read the third time, and passed.

Ormskirk District Gas Order: Copy presented.

Oil Extraction.

Mr. HARDIE, on May 14, asked the Secretary for Mines what was the cost of treating one cwt. or one ton of coal by the Bergius system of extracting oil from coal.

Commodore DOUGLAS KING stated that the Bergius process was still in the experimental stage, and no plant of the commercial size was in existence in this country, so that it was impossible to give even a rough estimate of the cost of the process. Much more work was required on the details before the cost of working, or the conditions giving the lowest cost of working, could be stated.

Replying to further questions by Mr. Hardie, Commodore KING said the pressures of hydrogen used in the experiments at the Fuel Research Station and those in Germany of which the Government have information, have varied from 2500 to 3700 lbs. per sq. in. The optimum pressure appears to depend on the individual coal being treated, the temperatures used, and, of course, on commercial and engineering considerations.

The coal consumed in hydrogenating one ton of coal may be divided into three parts—that used for power, that for heating, and that for manufacturing hydrogen. As power, heat, and hydrogen could all be obtained by electricity produced in hydro-electric plants, it is possible that in some circumstances that answer might be "none." If, however, coal was used for all these purposes, then the answer depended on how the process was organized. Dr. Bergius, in a paper read at the International Conference on Bituminous Coal held at Pittsburg in 1926, showed how the hydrogen might be obtained from the gas evolved in the process, and if this were done he estimated that eight cwt. of coal would be required for treating one ton of coal, in an efficient large-scale plant. He had no evidence to show that this was unduly optimistic, though the amount of coal used in the experimental plant was naturally much greater.

Mr. HARDIE: Are we now to understand that the only information that is to be had is from Prof. Bergius, and that all our technical men in this country have no information to give, despite the fact that they have been experimenting in our laboratories?

WINDERMERE GAS AND WATER COMPANY'S BILL.

Among the Bills before the Unopposed Bills Committee of the House of Commons (presided over by Mr. J. FITZALAN HOPE, Chairman of Ways and Means) on Wednesday, May 9, was that promoted by the Windermere District Gas and Water Company, which provides for the establishment of the thermal basis of charge for gas, and the fixing of a standard price and dividends, and confers further powers with regard to both the gas and the water supply branches of the undertaking. (The clauses relating to the gas part of the undertaking were mentioned in the "JOURNAL" for Feb. 1, p. 269.)

Mr. *Herbert A. Groves* (of Messrs. Sherwood & Co., the Parliamentary Agents in charge of the Bill) said that the Windermere Urban District Council was a very active body, and there had been negotiations between the Council and the Company, as the result of which a clause had been agreed, providing that if the Council promoted a Bill next session for the purpose of purchasing the Company's gas and water undertaking, at an agreed figure of £74,000, the Company will not oppose. This clause was inserted in the Bill.

An amendment has been made to the standard price for gas provided for in the Bill. This has been reduced from 15d. to 13·2d. per therm.

The Bill was ordered to be reported for third reading.

Gas as Applied to Domestic Water Heating.

An interesting and profitable evening was spent in the lecture hall of the Sutton Gas Company's showrooms on Wednesday, May 9, when the gas inspectors, plumbers, and fitters were invited to hear an address given by Mr. Adin St. Leger, of the Richmond Gas Stove and Meter Company, Ltd., on the subject of "Gas as Applied to Domestic Water Heating." The chair was occupied by Mr. Henry Gage, the Engineer and Manager of the Gas Company, who was supported by the Distribution Superintendent, Mr. J. Davis. After the lecturer had been introduced, the company settled down to hear a most instructive and invigorating talk. The lecturer, with the aid of drawings and actual appliances, described the construction of all the gas-heated water appliances now in everyday use, bringing out the features of each and the advantages of the particular design for special purposes. He enumerated the principal points on which an ideal heater should be constructed, and placed in order the matters of importance which should be considered in the construction—namely, maintenance, efficiency, and economy in working. The address was followed by a useful discussion. A hearty vote of thanks was unanimously accorded Mr. St. Leger, on the proposition of Mr. Davis.

Man Killed at Gas-Works.—One man was killed and another injured in an accident at the Croydon Gas-Works, Purley Way, on May 21. Colenso Evans, of Wentworth Road, Croydon, was taken to Croydon General Hospital, but died on the way. The injured man, Daniel Green, of Wilford Road, West Croydon, is in hospital suffering from internal injuries. The two men were pulling down an arch for a contractor, when the arch collapsed.

Good Working at Stratford-on-Avon.—The annual report of the Gas Committee of the Stratford-on-Avon Town Council was presented at a recent meeting, when Alderman Ballance, who moved its adoption, said they had had a very good year. A profit of £2733 had been made, of which £2000 had been earmarked for the relief of the rates. The make of gas had increased by 11·2 p.ct. The Committee recommended a reduction in the price of gas by 3d. per 1000 c.ft., which would affect the revenue by £1461.

LEGAL INTELLIGENCE.

JOHN WRIGHT AND EAGLE RANGE COMPANY, LTD. v. GENERAL GAS APPLIANCES, LTD.

An Action for Infringement.

(*Continued from p.* 470.)

Monday, May 14.

Dr. *Ballantyne* said that at the time the patent was granted to plaintiffs in 1913, facts were available to enable those engaged in the industry to proportion adequately all the combustion products so as to ensure their being carried away. Replying to Sir Duncan Kerby, Dr. Ballantyne said he had used gas fires manufactured by the plaintiff Company before and since the date of this patent. He had not made any systematic tests of gas fires, however, before this action was commenced.

Sir Duncan: It is a fact, is it not, that in tests of gas fires it is a difficult matter to obtain a reasonable degree of accuracy?—Yes.

May 15.

Dr. *Ballantyne* spoke of the tests he had made on the "Apollo" and "Swastika" stoves with the anemometer, and said that instrument showed differences in the rate of flow up the chimney ranging from 294 ft. in two minutes to 316 ft. in two minutes—a difference of 8 p.ct. Replying to Mr. Whitehead, K.C. (for the defence), Dr. Ballantyne said he could vouch for the accuracy of his tests. He expressed the opinion that the plaintiff's invention was founded on an erroneous conception; the main error, which he regarded as fundamental, being based on the assumption that, if there were two passages instead of one, that would reduce the tendency of the air to cool the radiants. It was a mistake to divide the flue into two parts, as Yates had done.

Mr. *John Bond*, O.B.E., Engineer and Manager of the Southport Corporation gas undertaking, said he had been employed in the gas industry for 42 years. For the purposes of this action he had made certain tests, and had carried out some of them on the "Apollo" stove, and he found that the inter-canopy space conducted a certain amount of air from the room. He agreed with the results of the tests that Dr. Ballantyne had given. Witness said he never thought the double passage was of any use at all.

Sir Duncan Kerby: Then why have the defendants copied it, assuming that they have?

Witness: I do not know that they have copied it.

May 16.

Mr. *Bond* was cross-examined by Sir Duncan Kerby about the "Vesta" and "Wizard" stoves.

Counsel asked him whether, before the appearance of plaintiff's patent in 1913, there was in the "Gas Journal" a discussion as to whether the Davis Company had succeeded in solving the problem of securing increased ventilation without loss of radiant efficiency.

Witness replied that he had some recollection of seeing some correspondence on that subject.

Counsel: And do you know that the Company advertised and asserted that they had done it better than was done in the "Wizard" stove at that date?

Witness: They may have done so. There was, I believe, a great deal of discussion about it.

Counsel: Yates asked Prof. Bone to conduct an investigation for the purpose of ascertaining the loss of radiant efficiency in the "Apollo" as compared with the loss in the "Wizard?"

Witness: I remember there was a controversy, and that Prof. Bone was asked to investigate.

Counsel: And in the controversy in May, 1913, Yates wrote a letter giving the effect of Prof. Bone's report?—Yes.

It showed that the loss increased as the draught was increased? That the "Vesta" was less efficient than the "Wizard?"—Prof. Bone dealt with the "Vesta."

His Lordship: What was said in 1912 has not been disputed, and we know that the Davis Company copied it with advantage in their stoves.

Counsel said that after the controversy, the Davis Company altered their stove and produced a new one in the autumn of 1913. They put upon the market a pair of the stoves in October, 1913, and that was immediately after the appearance of the patent in question in this action. The Davis Company made alterations in the stove because of Prof. Bone's report.

Further evidence was called for the defence to support the plea of prior uses in the "Apollo" stove of the plaintiff's patent, and His Lordship commenced to hear speeches on behalf of the parties, in which Counsel summarized the evidence and made certain legal submissions.

At the conclusion of the hearing, His Lordship reserved judgment.

MISCELLANEOUS NEWS.

IMPERIAL CONTINENTAL GAS ASSOCIATION.

ANNUAL ORDINARY GENERAL MEETING.

The Ordinary General Meeting of the Association was held on Wednesday, May 16, at Winchester House, Old Broad Street, E.C.—Sir Charles J. Jessel, Bart., in the chair.

The Secretary (Mr. F. H. James) read the notice convening the meeting; and thereafter the Common Seal was affixed to the Register of Proprietors.

The Chairman: I now beg to move:

> "That the interim dividend at the rate of 5 p.ct., less tax, paid in respect of the year ended Dec. 31, 1927, be hereby confirmed."

This was agreed to.

The Chairman then called upon the Secretary to read the Auditors' certificate on the accounts submitted; and this was done.

The Chairman: I have next to move:

> "That the accounts for the year 1927 and the Scheme prepared in accordance with the Companies Clauses Consolidation Act, 1845, showing the profit available for the purposes of dividend, which the proprietors have before them in the form of a Profit and Loss Appropriation Account, be taken as read."

This was agreed to.

Change of Meeting Place.

The Chairman: Well, now, ladies and gentlemen, I wish in the first place to call your attention to the fact that we are meeting today in a place rather different from our usual home. The reason for this is that, our new offices being at 2, Devonshire Square, Winchester House has become more convenient for the purpose. I should like to say, with respect to our new offices, that these have met with universal approbation. They are a tribute to the artistic skill of our Architect, Mr. William Lucas, and also to the good work done by the builders, Messrs. Trollope & Colls, Ltd., in a rather confined and difficult space.

Profit from Stations.

I will now proceed to pursue my usual custom of briefly taking you through the balance-sheet. On the right-hand top side, you will see that net profit from stations is up by £77,081. I daresay it is within the knowledge of all here present that 1926 was a particularly bad year for all gas companies, both English and foreign. The year 1927, on the other hand, showed far better results. It would therefore be better, on account of this situation, to take the average of the two years. I find that the average of the two years 1926 and 1927 comes to £198,969; and the profits for 1925 were £184,377. Therefore you may take it that the average increase for the years 1926 and 1927 was up by some £15,000, owing almost entirely to increased output and better and more economical working. The remainder of the profits of 1927, to the extent of about £40,000, are of a fortuitous character. I have explained more than once to you that we work abroad on a certain formula based, in the case of gas, on the price of coal and on wages. With respect to electricity, unfortunately, it is only on the price of coal. This formula necessitates a revision of price, as I have before pointed out, every three months; and therefore there is always a lag of three months. What has really happened is that we had to pay heavily in 1926 for our coal, and we got the increased profits in 1927. As to electricity, I would like to say that, through the fact that electricity is based on the price of coal only, we are working now at the formula price of Frs. 1·90, in comparison with Frs. 2·30 when I had the pleasure of addressing you this time last year—that is, 40c. down. Now, Frs. 1·90 represents less than 3d. per kilowatt-hour, a price which I am sure everybody in this room would be very pleased to pay in this country. ["Hear, hear."]

Sale of Electricity Station at Droogenbosch.

This item of "Net profit from stations" is going to look very different next year. First of all, as I need hardly point out, the smaller price received for electricity, and the smaller price to be received for gas, will affect the results; but besides this I must tell you that as from the beginning of this year we have sold our electricity station at Droogenbosch. The Board only arrived with hesitation at this solution of a rather difficult situation. We suffered—as Napier says happens to everybody except great men and fools—from indecision; but I think we came to the right conclusion, because we were confronted with a situation where the whole of Brussels, except the town, which has its own works, was going to band itself together in a combine and form a new Company. It was impossible for us to hold out—to play a lone hand—particularly as foreigners, and try to intervene, and perhaps spoil the plan upon which they had all set their hearts. The effect of the whole thing upon us is that we received for the Droogenbosch Works cash and shares in the new combine. Up to the present, of course, we have received the profits from working this station ourselves; and we hope in future to get some of these profits in dividends on our shares. But as the Company only commenced operations on Jan. 1 this year, the dividend on our shares in this new Company will necessarily not be available for our present year's balance-sheet. There is nothing to report from any of the other stations. You will see that dividends on investments

are slightly down, by £4500. The dividend on the Cie. Continentale du Gaz, which is our most important holding, was £8575 up, principally on account of the stabilization of the French exchange; but we get less from our interest and discounts, and we also sold one or two foreign holdings, to which I will refer later on.

ASSETS IN THE BALANCE-SHEET.

Now we come to the assets. The item of "Works, mains, &c.," is up £124,133, largely owing to electricity extensions. We meet these capital calls, of course, out of moneys we have set aside for this special purpose, and not by asking you to assist us by subscribing new capital. In the item of "Freehold land forming the sites of works" there is very little difference. As to our stocks at stations, naturally at the end of 1926, on account of the coal strike, these were very much reduced; and they have got into a more normal condition again now. Our cash at stations is down, because the stations have remitted more to pay for plant that was ordered here. I need hardly say anything about the cash at bankers. Then we come to sundry debtors, which item is up £21,260. Well, a good deal of this is due to a matter which I will explain as shortly as possible.

SHUTTING-DOWN OF THE KOEKELBERG WORKS.

We have at Brussels two works—the Forest Works and the Koekelberg Works. The latter are situated in a part of the suburbs of Brussels where a good deal of building has been going on of late years; and they are also rather out of date and uneconomical to operate. Then, again, we work in Belgium, where there is in force what they call the "Industrial Licence." That is, the Commune in which we are situated may say: "You will have to shut-up that industry, because it is a bother to your neighbours." Knowing, therefore, that we had a works both uneconomical to operate and objectionable to our neighbours, we came to the conclusion that the only thing was to produce gas elsewhere; and instead of building another gas-works farther off from Brussels, we put our money into a Belgian Company. This Company are going to have coke ovens, and the gas will be a residual product, which will be sold to us. We shall thus feel that, having put our money into this affair, even if we do lose concessions for gas in Brussels, we shall always have an interest in a works which will be able to go on producing coke, and therefore be of great value in spite of the loss of any contracts in the suburbs of Brussels. The call upon us is very small at present; but I assume we shall have to pay before the whole thing is in working order very nearly £200,000. The first tenders are already out; and we hope that this Company will be in full working order by the middle of next year. You will notice that loans in London and British Treasury bills are up; but that is a temporary matter. With regard to freehold property in London and abroad, it may be of interest to you to know that we have sold our last plot of land in Vienna, where we have held land ever since 1843. We had, on the other hand, small additions for showrooms. The reason why the item of freehold property is £18,000 down is because of the way in which our new offices in Devonshire Square have been treated. Our old offices, which cost over £30,000, and with additions we made very nearly £40,000, stood in our books at £10,000. They were afterwards sold for £30,000, and so there was a book profit of £20,000. We did not know whether we should be able to sell them so quickly; and therefore we had made a reserve of £25,00, in case we should have them left on our hands. That £20,000 profit and the £25,000 reserve together came off the cost of our present offices, which, including the furniture in them, stand in our books only at some figure between £3000 and £4000. [Applause.] There is nothing much else here that calls for remark. Our English, Colonial, and Indian securities are a little down, on account of investments having been sold to extend our works.

PENSIONS.

On the other side of the account, you will come to expenses in London. There have been lower administration and pension charges. Our pensions are a fairly large charge upon the Association, amounting, as they now do, to over £34,000 a year. Our pensioners and their wives, as I daresay you know, do not display that haste which they should do to "shuffle off this mortal coil" [Laughter]; and though we hope for relief in this respect in coming years, particularly in connection with our "dead" stations, yet I rather think that one of these days we shall have to consider seriously the question as to whether our pension fund should not be increased. Income-tax is more, because we have had increased profits. Interest on debenture stock is down, owing to the operation of cancellation. The general amortization account displays a natural growth which I need not explain. Depreciation of sundry assets is a small sum, chiefly having reference to depreciation of old stores. I do not think there is anything else on that side of the Profit and Loss Account about which it is necessary for me to speak. Coming to the liabilities, £5210 of debenture stock has been cancelled. There are still four stockholders who would rather leave their money with us than take it. Dividends unclaimed are down, because the State was informed about the death of a stockholder who was supposed to have been drowned in 1860; and we had to pay all the dividends that were not Statute barred. Sundry creditors are down. There is less due for plant and stores. Credit balances show the rather large increase of £168,000. Of course, that includes the profit we make on buying debenture stock, and also the profit we have made by the sale of investments, and depreciation reserves we make on account of land. A profit of very nearly £100,000 was made by the sale of our shares in the Wiener Gasindustrie Gesellschaft and the Hungarian Gas and Electric Company.

HUNGARIAN INVESTMENT REALIZED.

When I say that we have made a profit of very nearly £100,000, I do not wish for one moment to make you believe that we have made a real profit on the original investment. I daresay that investment cost us many years ago between £500,000 and £600,000. What happened was this: When we wrote down everything, as we did in 1921 (the first balance-sheet we were able to show after the war), we wrote that investment down to a nominal sum; and the profit of £90,000 to £100,000 we show on that was due to the fact that we had so written it down. We sold this investment because the whole situation through the war had been changed. Hungary was divided up; and we found some of the stations of the Company were in one country, and some in another, while we had lost several concessions that the Company originally had in Hungary. Then, again, members of this Board who had been on the Board of that Company had, of course, all been cast off during the war. The English engineer we had to represent us at Budapest had also been sent home, and we had lost touch. Therefore after very long negotiations, most ably conducted by our Secretary (Mr. James), we were glad to secure what we thought was a quite adequate price for what the shares represented. The renewals fund is down, because, of course, we have sometimes to make a considerable call on this item, through having to extinguish book value of plant we have scrapped. I do not know that there is anything else in the balance-sheet to which I need call your attention. You will see that the item "Commissioners of Inland Revenue" is a little down. That means to say that we happen to owe them less than a year ago under Schedule D. I can only add that if any shareholder wishes to ask me any question in respect of the figures before the meeting, I shall be pleased, as far as lies in my power, to answer him.

PRICE OF THE ASSOCIATION'S STOCK.

There is, however, just one other matter to which I should like briefly to refer before putting the motion to the meeting—that is, the price of our stock. I know, of course, that the price of the stock has really nothing to do with the Board of Directors; but our stock suddenly, within about the last three weeks, has gone up no less than 16 or 17 points, and we have had many inquiries as to the reason for this. I think I can only trace it to a newspaper which, towards the end of April, was so kind as to what is vulgarly termed "tip" our stock. I should not allude to this were it not for the large number of what I consider to be mis-statements made in this newspaper ["Hear, hear"], which I understand has sundry millions of readers. The paper first of all said that we supply many important cities on the Continent of Europe. We only supply one important city at the present moment on the Continent of Europe, and that is Antwerp, the concession for which expires in 1932. Then, again, it said that we supply gas and electricity to Brussels. We never supplied electricity to Brussels, because when we had Brussels, which we lost in 1878, electricity for lighting purposes did not exist. It is fifty years since we supplied the town of Brussels with gas; and the town now furnishes both these utilities itself. It is true that we have the supply of gas and elecricity to many important suburbs of Brussels; and I am sorry to say that one of the most important of these suburbs so far as electricity is concerned—Anderlecht—is going to fall away from us, and in January, 1929, will no longer be one of our concessions. Compared with the other portions of the Brussels suburbs, it is a fairly recent acquisition. It is not one of our real children; it is an adopted child which we bought as lately as 1912. We tried all we could to retain it, even at some sacrifice; but we were the sport and plaything of politicians, and although we believe we made more favourable proposals than were finally accepted by them they refused to give it to us. The article went on to say that through the Cie. Continentale we supply the suburbs of Paris. That is entirely untrue. It also stated that we supply Bordeaux. The Imperial Continental Gas Association did supply Bordeaux; but the office tells me we lost it as long ago as 1875. [Laughter.] The article went on to say that we have some concessions near the Swiss border. I do not pretend to know what that means. The nearest important station the Cie. Continentale has is at Nancy, which is some way from the Swiss border.

THE DIVIDEND.

The CHAIRMAN: I now beg to move:

> "That upon the holdings of capital stock as registered in the books of the Association on the 25th of April, 1928, there be paid on the 23rd of May, 1928, less income-tax at 4s. in the pound, a final ordinary dividend for the year ended Dec. 31, 1927, at the rate of 5 p.ct. (actual), making with the interim dividend of 5 p.ct. (actual) paid in November, 1927, a dividend of 10 p.ct. for the year, leaving £120,246 18s. 7d. to be carried forward to the next account."

The DEPUTY-CHAIRMAN (Col. H. LeRoy Lewis, C.B., C.M.G., D.S.O.): I have pleasure in seconding that.

The resolution was carried.

The CHAIRMAN: I have next to move:

> "That the accounts, together with the scheme for the appropriation of the profits, which have been submitted, be received, adopted, and entered upon the minutes."

The DEPUTY-CHAIRMAN seconded this, and it was agreed to.

RE-ELECTIONS.

The DEPUTY-CHAIRMAN: It now falls to my lot to move a resolution about which we have a self-denying ordinance. I am going to propose the re-election as a Director of your Chairman. We have an unwritten law on this Board that no Director should be allowed to make a eulogistic speech about one of his colleagues; but I must say that I feel very much tempted to break the rule on this occasion. I might indulge in an oration lasting half-an-hour, eulogizing the excellent qualities of our Chairman; but I will refrain from doing that. I am, however, going to commend this resolution to you, because from very long connection with Sir Charles Jessel I know

he is devoted to the interests of this Association, and that he has nothing nearer at heart than serving the shareholders of the Imperial Continental Gas Association. [Applause.]

The resolution having been formally seconded,

Mr. F. Tomkinson said: I should like to endorse all that can possibly be stated eulogizing the Chairman. You have touched upon the price of our stock, Sir. I may say that this morning I made an inquiry of the Exchange, and the reply was: "175-177, but no stock offering." The reference to the newspaper article is very amusing, and shows clearly the amount of reliance that should be placed upon such articles. I should like to say that I think the present price is really justified for a stock that is paying 10 p.ct.

The resolution was carried unanimously.

The Chairman: Thank you very much for this renewal of your confidence. It is perfectly true that the interests of this Association are very dear to me. I have been a Director for very nearly one-third of a century; and so I am rather at home with all its good points, and even with some of its failings. I now move—and I am going to adhere strictly to the rule that I have laid down—the re-election as Directors of the Rt. Hon. Sir Guy Douglas Arthur Fleetwood Wilson, G.C.I.E., K.C.B., K.C.M.G., and Mr. Harold Godfrey Palmer.

The Deputy-Chairman seconded this, and it was agreed to.

On the proposition of Mr. Gurney Barclay, seconded by Mr. Rowe, the retiring Auditor (Mr. T. B. Bassett) was re-appointed.

Acknowledgments.

The Chairman: Before we separate, I should like, without making it a question of formal motion, again to express, as I have done on so many previous occasions, our grateful thanks to the staff, both in London and abroad, for the good work they have done during the past year. I would specially wish to thank the gentleman who sits on my left hand, Mr. James, our Secretary, for the work he has had to do in a very trying year. I can say from experience how trying it has been, because you must remember that I have been Chairman of the Association for fifteen years. Before the war we had a much larger business, with millions more capital, but I can say that more work is thrown upon the Secretary nowadays, with all the difficulties that we have been involved in abroad, than was the case in the old days; and he has carried out his duties with the greatest ability and industry. [Applause.]

Miss Cotton: Will you allow me, as one of the very oldest shareholders, to express my deep appreciation of all that the Chairman and Directors have done for us. I have listened attentively to what you have had to say; and I am most grateful. One always feels that this Company is so very secure and sound. ["Hear hear."]

CAPE TOWN AND DISTRICT GAS LIGHT AND COKE COMPANY, LTD.

The Thirty-Eighth Ordinary General Meeting of the Company was held on Wednesday, May 16, at the London Offices, No. 38, Grosvenor Gardens, S.W.—Mr. H. R. Savory (the Chairman) presiding.

The Managing Director and Secretary (Mr. R. W. Blackburn) read the notice convening the meeting and the Auditors' report; and the Directors' report and the statement of accounts for the year to Dec. 31 were taken as read.

The Chairman, in moving the adoption of the report and accounts, said: Good progress continues to be made in the Company's business; and you will have seen from the report that the credit balance of the revenue account is £23,407, which, compared with that of 1926, shows an increase of £3316. Good progress also has been made in the increased quantity of gas sold, which is equal to an increase of 3·43 p.ct.

Price of Gas Reduced.

Early last year the Board decided to make alterations in the price of gas by a reduction to consumers by ordinary meters of 5 p.ct. per 1000 c.ft., and to increase the quantity supplied for 1s. by prepayment meters from 90 to 100 c.ft., as well as to revise the charges to consumers of gas for industrial purposes on a more liberal scale. These alterations took effect from July 1 last, and have resulted in an increase in the demand for gas; and the revenue from that source has been fully maintained. Two-thirds of this increase in gas sold occurred in the last half of the year, while these alterations were in force. In the revenue account, gas sales, meter rentals, &c., show an increase of £395. The revenue from sales of residuals has not been quite so good as in 1926. This was due to less coke being available for sale; the tonnage of coal carbonized having been less by 787 tons, so that less coke was made and less could be sold. More tar was sold; but prices obtained were not so good. Low prices had to be accepted in competition with those of imported tar and Trinidad bitumen, which is now largely used instead of tar for road making and road repairs. Thus the total revenue was reduced by £651; but this has been amply compensated for by the reduced cost of the manufacture and distribution of gas, and by economies in expenditure on repairs and maintenance of works, plant, mains, &c., which amount to £3966.

The Year's Profit.

The profit and loss account shows how the profit has been dealt with, and that a balance of £8342 is carried to the balance-sheet. In the balance-sheet you will see that the sum of £9341 has been expended on additions to works, plant, and mains—principally upon extensions of mains, new services, and installations. More than 3 miles of new mains have been laid down, and 269 new consumers have been supplied during the year. The cash required for these extensions has been provided out of the income of the past year. No issue of capital has been made, and temporary loans have been reduced from £10,000 to £8000. The item "Stock and Stores" is higher (£2582), and so is the amount of "Sundry Creditors" (£3743). These increases are due to preparations for extensions of our mains and for new business for this year. There is one new item in the balance-sheet—namely, "Pensions Fund, £2000." This sum has been allocated from our own Insurance Fund to form a nucleus for pensions for the Company's employees; and it is hoped that we shall be able to make additions to this fund from time to time in future years. Before I move the adoption of the report and accounts, I will ask our Managing Director to give you details of the Company's working during the past year.

Further Details of the Working.

Mr. Blackburn: Our Chairman has mentioned that, notwithstanding a reduction in the price of gas, the figure of gas revenue was maintained; and I will therefore deal with the reductions in operating expenses during the past year, which have resulted in a net increase in profit of over £3300. Although the make of gas was slightly larger, coal carbonized was less by 787 tons, showing a very substantial saving on coal account. Gas made and sold per ton of coal increased; and the figure of gas unaccounted-for was again reduced. The volume of gas sold for all purposes was greater by nearly 3½ p.ct.; and gas sales per cent. on make improved, due to the saving on leakage account. This tends to show that the large expenditure which we have incurred on repairs and maintenance of mains and services during the last three or four years has entirely justified itself.

South African Coal.

In dealing with the subject of working, I should like specially to refer to one of the most important considerations affecting results—that is, the quality of coal obtainable. By considerations of price, and for other reasons, we are confined at present to the use of coal mined in South Africa; and from a gas-producing point of view, and also from the point of view of coking qualities, these coals are very indifferent, compared with average British, Australian, or Indian gas coals, due primarily to their low volatile and high ash content. Careful tests and experiments were carried out over a long period before any large contract were placed; and it was only after experience had been gained in carbonizing South African coal that our Engineer succeeded in combining successfully different classes of these coals to yield an improved make per ton of gas of a satisfactory quality, and at the same time to produce a good saleable coke. The yield of tar per ton also is exceptionally low. This has now improved, but great difficulty has been met in making a marketable product to compete with the imported article. Here, again, extensive tests and research work have been necessary, and are still proceeding, with the object of improving our output to such a degree as will render it entirely suitable for road surfacing; and I am glad to report that we are now dealing satisfactorily with larger contracts which have come forward. Gas undertakings operating in Dominions so far away all have their difficulties to meet. Our Company is not alone in this respect; but I emphasize this point in regard to coal because, in comparing our results with those of other undertakings perhaps more favourably situated, in fairness to our officials regard must be had to special conditions affecting working. I am therefore all the more pleased to be able to report the steady improvement that month by month our comparative records show has come about.

Increase in Number of Consumers.

The number of consumers increased by 269, and 296 additional gas cookers and 178 geysers were installed during the year. The number of processes in which gas is utilized is mounting. It is being used in increasing quantities in Cape Town for bread and biscuit baking, for furnaces, for melting metals, for coffee roasting, in laundries, and in the canning industry. In hotels, clubs, and large restaurants kitchens have been equipped with modern gas-consuming installations for cooking, water heating, &c. The volume of gas sold at special rates for industrial purposes increased by 4·6 p.ct. for the year; and I may mention that a special showroom has been opened recently to deal with industrial gas requirements, and is proving of great advantage in this section of our business. The cost of extensions and improvements falls to be provided out of current resources. Every avenue of expenditure has to be considered carefully; and I think that the results now before you on the whole indicate that considerable improvement in working has been effected. I have pleasure in paying a tribute to our officials and employees in Cape Town for their good work carried out during the year.

Pensions Fund.

Reference has been made by the Chairman to the matter of a Pensions Fund. I would point out that the allocation for this purpose does not affect the year's revenue account. There is in our books a substantial reserve in respect of workmen's compensation insurance and marine risks insurance; and the initial amount carried to the Pensions Fund has been transferred from this source. Your Directors have given the subject careful consideration; and it is felt to be very desirable that a commencement should be made to accumulate funds towards the superannuation of old long-service employees. It is hoped that the progress of our business will be such as will permit of the fund being augmented from year to year, and eventually being placed upon a secure footing. I hope share-

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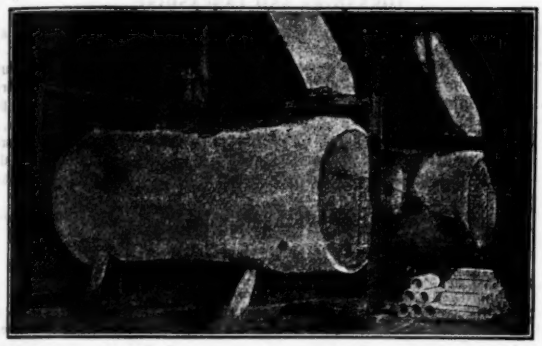

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holders will heartily endorse this policy, which should prove in the interest of the Company, as well as in that of its loyal servants.

PROSPECTS.

Now as to the prospects of the current year. The recent South African Budget discloses a surplus of £1,750,000, part of which it is proposed to apply in reduction of taxation; and the outlook for trade and business generally is regarded as hopeful. Building in and around Cape Town is continuing—particularly in the erection of blocks of flats—and in some districts the demand for gas is outstripping the capacity of mains to provide an adequate supply and pressure. To maintain and extend business, it will be obvious that the means for this purpose require to be provided; and we are again faced with heavy expenditure this year for renewals, for alterations and extensions of mains, and for new services and installations. It is not the intention to propose any addition to the existing issued capital. Arrangements have been now concluded whereby the Company will have command of facilities on reasonable terms, which will allow of extensions being developed and new business being dealt with beyond what would be possible had the cost to be provided out of any one year's income.

THE DIVIDEND.

The CHAIRMAN then moved that the Directors' report and statement of accounts for the year ended Dec. 31, 1927, be received, approved, and adopted, and that a final dividend of 4 p.ct. (less income-tax), making 7 p.ct. for the year, be declared on the ordinary shares, payable forthwith.

Mr. C. W. LILLEY seconded the motion.

Mr. C. C. MALLETT asked whether the Company were up against keen electrical competition.

Mr. BLACKBURN replied that the electrical competition was very strenuous; but notwithstanding this the Company were progressing steadily, and more particularly on the industrial side of the business.

Mr. CLIFFORD HUNT inquired as to the make of gas and the system of carbonization employed.

Mr. E. NICHOLLS said he felt, after what they had heard that day, that they ought to be satisfied with the progress the Company were making. At the same time, no doubt an increase in the dividend could be greately appreciated by the shareholders. An increase of 1 p.ct. would probably have the effect of putting their shares again at par.

Mr. BLACKBURN said the question of the dividend had been carefully considered by the Board; but for a number of very good reasons it had not been found possible yet to increase the distribution. The total yearly make of gas had now reached 220 million c.ft. The quantity made per ton was increasing, because they had found the advantage of steaming and had discovered a combination of coals which gave a larger yield of a good standard calorific value gas. He thought they would be able to maintain these results, provided they could depend upon getting an even quality of coal.

The resolution was then put to the meeting and carried unanimously.

The re-election as a Director of Mr. C. W. Lilley was agreed to, on the proposition of the CHAIRMAN, seconded by Mr. R. A. FAIRCLOUGH; and the Auditors (Messrs. Kemp, Chatteris, Nichols, Sendell, & Co.) were re-appointed, on the motion of Mr. A. E. HAYES, seconded by Mr. S. J. TUNGAY.

Mr. LILLEY, returning thanks for his re-election, pointed out, on the matter of dividend, that the price of gas had been reduced during the past year; and that it was thought advisable to test fully the results of this policy before embarking on a change in dividend policy which once made it would be most desirable should be maintained. For other reasons also this was not the moment to increase the distribution. The business was growing, and the cash requirements were very heavy. After all, 7 p.ct. was quite a good dividend.

The proceedings concluded with a hearty vote of thanks to the Chairman, Managing Director, the other members of the Board, and the officers and staff for the excellent manner in which they had served the interests of the Company. This was moved by Mr. NICHOLLS, and seconded by Mr. TUNGAY.

GAS METER TESTING IN IRELAND.

In the Irish Free State Parliament, the second reading was passed of the new Gas Regulation Bill.

Mr. MCGILLIGAN, Minister for Industry and Commerce, explained that the object was to secure uniformity in regard to the testing of meters. Many regulations which existed at present depended on the Act of 1859; and while the provisions of that Act were fairly satisfactory, its application was entirely unsatisfactory, because there was the peculiar limitation that it was only operative in the areas where established by the local authorities as operative.

Since that Act all but two—those in Dublin and Cork—of the gas companies in the Free State had no statutory provision for the testing of meters. The 1920 Act had improved matters in some respects, but it failed to improve matters so far as meter testing was concerned.

The Bill proposed to remedy this. It required that all gas meters should be properly verified and stamped, and also required that every inspector appointed by the local authority should test any meter. Section 2 made provision for the setting up of testing stations in the county boroughs. Other sections provided that only the Saorstat stamp would be valid; for the adoption of the thermal system of charging; and the method of appointing examiners of meters.

Mr. ANTHONY (Lab.) said it was provided in the Bill that all meters would be tested within one year of its passing, but he thought this period should be extended to two years. As a result of the passing of the Bill, Dublin makers of meters might not be able to supply all the meters required in a year, but they would be able to do so in two years.

GAS REGULATION ACT APPLICATIONS.

SPECIAL ORDERS.

Bishop's Stortford, Harlow, and Epping Gas and Electricity Company.

To authorize the Company to utilize scheduled lands for gas purposes; to make provisions as to the standard price for gas; and for other purposes.

Sheppy Gas Company.

To authorize the substitution for the existing maximum price of a standard price per therm; to make provisions as to dividend payable; to empower the Company under certain conditions to pay a minimum rate of dividend; to provide for the establishment of co-partnership; and for other purposes.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *May 21.*

The market for pitch is quiet, and little business is reported. Creosote also is somewhat easier. Current values are as follows:

Pitch, 65s. per ton.

Creosote, about 8¼d. per gallon.

Pure benzole, 1s. 8d. to 1s. 9d. per gallon; pure toluole, about 2s. 2d. to 2s. 3d. per gallon; 95/160 solvent naphtha, about 1s. 7d. per gallon.

Pyridine is 5s. 3d. to 5s. 6d. per gallon.

Tar Products in the Provinces.

May 21.

There was little alteration in the market for tar products during the week.

Pitch continues quiet. There have been one or two inquiries from the Continent for near delivery; but so far as forward delivery is concerned, the Continent appear to be withholding their demands, hoping for lower prices. On the other hand, producers in England seem to be quite easy and in no hurry to sell.

Creosote oil is still quiet. There are one or two inquiries for home consumption; but buyers are not inclined to pay existing prices.

Water-white products continue firm, and there is a good deal of inquiry for same. Makers are firm in their ideas, as there is talk of a further advance in the price of petrol.

Crude carbolic is still very firm indeed, and there are buyers for delivery even into next year.

Cresylic acid keeps firm, particularly for the best qualities.

Naphthalene is steady.

The average prices of gas-works products during the week were: Gas-works tar, 43s. 3d. to 48s. 3d. Pitch—East Coast, 62s. 6d. to 65s. f.o.b. West Coast—Manchester, 55s. to 57s. 6d.; Liverpool, 57s. 6d. to 60s.; Clyde, 60s. to 62s. 6d. Toluole, naked, North, 1s. 5d. to 1s. 6d. nominal. Coal-tar crude naphtha, in bulk, North, 8d. to 8¼d. Solvent naphtha, naked, North, 1s. 1¼d. to 1s. 2d. Heavy naphtha, North, 1s. to 1s. 0¼d. Creosote, in bulk, North, liquid, 6⅜d. to 6⅝d.; salty, 6¼d. to 6½d.; Scotland, 6¼d. to 6½d. Heavy oils, in bulk, North, 8¼d. to 8½d. Carbolic acid, 60 p.ct. 2s. 3d. to 2s. 4d. prompt. Naphthalene, £13 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Benzole Prices.

The folowing are considered to be the market prices to-day:

	s. d.	s. d.	
Crude benzole . . .	0 10½	to 0 11	per gallon at works
Motor ,, . . .	1 4½	,, 1 5	,, ,, ,,
90 p.ct. ,, . . .	1 5½	,, 1 6	,, ,, ,,
Pure ,, . . .	1 9	,, 1 10	,, ,, ,,

TRADE NOTES.

Underfeed Stoker Company, Ltd.

Among a number of important contracts recently secured by the Underfeed Stoker Company, Ltd., of African House, Kingsway, London, W.C., is one from the Primitiva Gas Company of Buenos Aires, for a coal handling plant.

The Quebec Power Company.

In connection with the new two million c.ft. capacity gas-works to be erected at Quebec this year, the contract for the various work has been let to British manufacturers against serious American competition. We are informed that the Woodall-Duckham Company, Ltd., will supply the carbonizing plant, the Whessoe Foundry and Engineering Company all the gas purifying and cleaning plant, and Messrs. R. & J. Dempster, Ltd., the gasholder.

"Simplex" Water Gas Plant.

The Vertical Gas Retort Syndicate, Ltd., of 17, Victoria Street, Westminster, have received an order from the Bridge-of-Weir Gas Company, Ltd., for an improved "Simplex" water gas plant.

Gas Exhibition at Ballymena.—Promoted by Mr. Cyril Surman, the town's recently appointed Gas Manager, a gas exhibition had a very successful run in Ballymena, Co. Antrim, last week. The principal object was to popularize gas for cooking and heating purposes; and Miss Edith Sanderson gave lectures and practical cookery demonstrations. At the opening ceremony, Mr. Wm. Shaw (Chairman of the Urban Council), who presided, paid high tribute to the abilities of their new Manager. The exhibition was declared open by Mrs. W. R. Young, J.P., of Galgorm Castle.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

On the whole, markets are displaying satisfactory steadiness. Northumberlands are still feeling the effects of strong Continental competition; but so far there has been no breaking of the agreed minimum prices. In Durham, the general outlook is brighter, and buyers show more inclination to contract for forward periods at current prices. Though these are in most cases barely enough to cover production costs, the movement is more satisfactory than anything for some time past. There is still room for more prompt trade, but, where necessary, collieries are lying idle rather than accept lower prices.

In the circumstances, there is little change in quotations. Wear Special gas makes ask 15s. 6d. to 16s. f.o.b., and best qualities 15s. Seconds are 13s. 6d. to 13s. 9d., and ordinaries are mostly firm at 13s. 3d. Coking has been in better request, and 13s. 6d. to 13s. 9d. is about the value. Best quality unscreened steam is well sold, and 14s. 9d. is quoted steadily. Seconds and others are 13s. 3d. to 13s. 6d. Gas coke is moving slowly for prompt, but for forward contracts 21s. f.o.b. is quoted. Current price is about 19s. f.o.b. for shipment.

YORKSHIRE AND LANCASHIRE.

Gas coals are not in urgent demand. Business for the immediate future and for contracts is on the basis of last year's figures.

General industrial coals have not been in keen demand, and values have varied in accordance with the position at each supplying colliery. Washed smalls and slacks deteriorated somewhat throughout the week, the previous week's values not having maintained their level.

The export section reports more inquiries from abroad, as a result of the grant from the Central Association; and it is evident that the Five Counties Scheme is working more smoothly than was the case some weeks ago.

Prices for domestic fuel are stationary; secondary qualities for bagging being in chief request.

MIDLANDS.

There is no development of importance to record. Demand is slow in every department. Householders are indifferent. Talk of higher prices has been apathetically received. The evolution of new ways of living makes the domestic routine less and less dependent on solid fuel. In the industrial branch there is no increase of activity to stimulate demand. Gas and other public utility undertakings have contracted for supplies sufficient to give them a big margin of safety. So far as gas-works are concerned, the tendency is to reduce delivery quotas rather than to increase, notwithstanding that offers of spot lots no longer demoralize the market.

In the circumstances the attempt made by collieries inside the Five Counties Scheme to raise prices by something like 1s. 6d. has miscarried. Where special considerations apply, the advance may be paid in order to get coal from a particular pit. Such cases are very few, however. Corresponding grades of coal are to be bought at the old rates from sources outside the control. In those instances where the advances are insisted upon, business is diverted, with few exceptions. This means that a number of collieries have to rely on old contracts to keep them going; and work is short.

There is no indication of such an absorption of stocks as to set up new market stresses. Some unassociated collieries are working full time, but productive capacity is not extended. The initiative remains with the buyer.

CONTRACTS OPEN.

Coal.

The Gloucester Gas Light Company are inviting tenders for gas coal. [See advert. on p. 554.]

The Mansfield Gas Committee invite tenders for screened gas coal or cobbles. [See advert. on p. 554.]

Gasholder.

Tenders are invited by the Edinburgh Gas Department for the construction of a gasholder. [See advert. on p. 554.]

Lime.

Tenders are invited by the Mansfield Gas Committee for lime. [See advert. on p. 554.]

Pipes

Tenders are invited by the Marple Urban District Council for the supply and delivery of cast-iron, spun, or steel pipes and specials. [See advert. on p. 554.]

Sulphuric Acid.

The Mansfield Gas Committee are inviting tenders for the supply of sulphuric acid. [See advert. on p. 554.]

"A Century of Service."—This was the title of an address delivered by Mr. W. M. Mason, Manager of the British Commercial Gas Association, before the Gloucester Rotary Club on May 11. Mr. Mason said they were surrounded by all the wonders of modern civilization, such as electricity, wireless, and aircraft. But there were even more commonplace things which were wonderful, but which were forgotten. Gas was one. It was something from which everyone benefited and profited at home, and probably in business. They never appreciated gas until the service was interfered with. In Gloucester, every year, there was the essence of 30,000 tons of coal passing unseen through the pipes into the homes of the people, and assisting in a multitude of ways, making work an easier and pleasanter task for the women.

Further News Items appear on p. 552.

STOCK MARKET REPORT.

PROFIT-TAKING was the dominant feature on the Stock Exchange last week, and the Industrial market had what is probably the most important reaction in prices since the long sustained boom commenced. In many quarters the belief was expressed that it was actually broken; but as some of the specialities revived towards the close of the week, it is possible that the reaction was only temporary.

The gilt-edged section at the outset maintained a steady tone, but with the raising of the New York rate prices were inclined to fall. The proposed new loan of the London County Council may possibly have had some influence on values. £5,000,000 of this issue is being offered for cash, and the yield at 94½, bearing 4½ p.ct. interest, is ½ p.ct. cheaper than the Kenya loan.

The check to the progress of Industrials did not extend to the Gas Market, which, in fact, was more active than usual. It will be seen from the Table that there were an unusual number of increases in quotations, among which were four improvements in debenture stocks, the principal being a rise of 3 points in the Eastbourne 5 p.ct. to 93-98. These debenture stocks are well worth the attention of investors not confined to trustee securities, the yield being materially above the 5 p.ct. so difficult to obtain on "first charge" stocks in public undertakings.

A matter of interest to gas stock investors is the approval of the Joint Select Committee of both Houses of Parliament of the principle of the basic price and dividend system on the South Suburban Gas Bill. Among the undertakings who have obtained such powers are the South Metropolitan, Commercial, Sheffield, Cardiff, and Swansea Companies.

The Montevideo Company announce a final dividend of 7 p.ct. (free of tax) making 6 p.ct. for the year.

The following transactions were recorded during the week:

On Monday, British 115, Continental Union 34, Croydon sliding-scale 111¼ maximum dividend 85, Gas Light and Coke 19s. 1½d., 19s. 3d., 19s. 3⅜d., 19s. 4d., 19s. 4½d., 3¼ p.ct. maximum 64, 4 p.ct. preference 78⅜, 78¾, 79½, 3 p.ct. debenture 61, Imperial Continental 174½, 175, 177, Montevideo 93½, 94½, North Middlesex 6 p.ct. 98½, 99½, Primitiva 24s. 9d., 25s., 25s. 1½d., 25s. 3d., 25s. 4½d., 25s. 6d., South Metropolitan 105⅜, 105⅝, 106¼, 106½. Supplementary prices, Reading 5 p.ct. 85, Southend-on-Sea new 93½, 94, new "B" 87½, 88, Wandsworth 5 p.ct. debenture 100¾.

On Tuesday, Aldershot 77, Bournemouth 6 p.ct. preference 11, 11½, Brighton and Hove 6 p.ct. 117½, 117¾, 118, 5 p.ct. 105, 106, Gas Light and Coke 19s. 1½d., 19s. 2½d., 19s. 3d., 19s. 3⅜d., 19s. 4½d., 4 p.ct. preference 78⅛, 78½, 79½, Imperial Continental 175, 176½, Montevideo 93⅜, 94¼, Primitiva 24s. 6d., 24s. 9d., 24s. 10½d., 25s., 25s. 1½d., 25s. 3d., 25s. 4½d., 25s. 6d., South African Lighting Association 5, 5½, South Metropolitan 105½, 106, 106½ Supplementary prices, Grays and Tilbury new 5 p.ct. debenture 98¾, Redhill "B" 80½, 81, Romford 10 p.ct. 10½.

On Wednesday, Alliance and Dublin 94, Brighton and Hove 6 p.ct. 118, Colombo 31s. 6d., 32s., 7 p.ct. preference 20s. 9d., 21s. 3d., Commercial 90½, Croydon maximum dividend 86½, Gas Light and Coke 19s., 19s. 1½d., 19s. 3d., 19s. 3⅜d., 19s. 4½d., 3¼ p.ct. maximum 64, Imperial Continental 171, 175½, 177, Lea Bridge 5 p.ct. 97, 98, Primitiva 25s. 6d., 25s. 9d., 26s., 26s. 3d., South Metropolitan 106, 106½.

On Thursday, Alliance and Dublin 94½, Bournemouth 6 p.ct. preference 11, 11⅛, British Gas Light 114½, Colonial 24s. 3d., 8 p.ct. preference 21s. 6d., Gas Light and Coke 19s. 1½d., 19s. 3d., 3¼ p.ct. maximum 64, 4 p.ct. preference 78⅞, Imperial Continental 175, 175¼, 175⅜, 176, 177, 178, Primitiva 25s. 9d., 25s. 10½d., 26s., 26s. 1½d., 26s. 3d., South Metropolitan 106½, 6½ p.ct. debenture 101½, 101⅞, 102, Southampton 5 p.ct. maximum 78½, 79¼. Supplementary prices, Croydon 4 p.ct. debenture 78¾, Grays and Tilbury new 5 p.ct. debenture 98¾, Wandsworth 5 p.ct. debenture 100⅜.

On Friday, Bombay 22s. 3d., Brighton and Hove 6 p.ct. 118½, British 115½, 4 p.ct. debenture 77, Commercial 90½, Gas Light and Coke 19s., 19s. 1½d., 19s. 2½d., 3 p.ct. debenture 61⅜, 6 p.ct. Brentford debenture 104, Imperial Continental 174, 175½, 175⅝, 176, 176½, 176⅔, 177, Primitiva 25s. 9d., 26s., 26s. 3d., 26s. 4½d., South Metropolitan 105⅞, 106½. Supplementary prices Brighton and Hove 4 p.ct. debenture 77⅞, Uxbridge 5 p.ct. debenture 98½, 98⅞, Wandsworth 5 p.ct. debenture 100⅜.

The advance in the New York rate had an immediate effect on the discount market at the close of last week, and firmer conditions were reflected in the higher average rate at which Treasury Bills were allotted. This average, £4 0s. 2·85d. p.ct., is about 1s. 5¼d. above the average for the previous week. Loanable credits were plentiful, and the highest rate obtained for both new and old loans was 3½ p.ct.

On the Foreign Exchange Market, the dollar-sterling, after fluctuating more widely than usual, closed at 4.88 5/16, showing a slight decline on balance.

Silver, with China buying, rose to 27 1/16d. per oz. Gold was steady at 84s. 11d. per oz.

The Bank Rate is 4½ p.ct., to which it was reduced from 5 p.ct. on April 21, 1927. The Banks' deposit rate is 2½ p.ct. and the deposit rates of the discount houses are 2¾ p.ct. at call and 2⅞ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. May 18.	Rise or Fall on Week.	Transaction Lowest and Highest Prices.
£			%p.a	% p.a.				
171,978	Stk.	Feb. 9	5	5	Aldershot 5 p.c. max. C.	72—77	..	77
412,992	,,	,,	4	4	Do. 4 p.c. Pref.	69—72	..	..
1,551,868	,,	Apl. 12	7	7	Alliance & Dublin Ord.	93—96	..	94—94½
374,000	,,	Jan. 12	4	4	Do. 4 p.c. Deb.	64—67	..	..
522,654	,,	Mar. 8	7	7	Barnet Ord. 7 p.c.	109—112	..	..
300,000	1	Apl. 26	1/7½	1/7½	Bombay, Ltd.	21/—23/-	..	22/3
170,000	10	Mar. 8	8¼	8¼	Bournemouth 5 p.c.	12½—13½	..	..
600,050	10	,,	7	7	Do. B 7 p.c.	12—12½	..	..
375,000	10	,,	6	6	Do. Pref. 6 p.c.	10½—11	..	11—11¼
50,000	Stk.	Jan. 12	3	3	Do. 3 p.c. Deb.	56—59	..	..
163,025	,,	,,	4	4	Do. 4 p.c. Deb.	76—79	..	..
357,900	,,	Mar. 8	7½	7½	Brighton & Hove 6 p.c. Con.	116—119	+1	117½—118½
341,880	,,	,,	6/8/6‡	6‡	Do. 5 p.c. Con.	103—106	..	105—106
1,387,500	,,	Feb. 23	6	6	Bristol 5 p.c. max.	87½—88½a	+½	..
855,000	,,	Mar. 22	8	7	British Ord.	113—116	..	114½—115½
100,000	,,	Dec. 22	7	7	Do. 7 p.c. Pref.	114—117	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	73—76	..	77
200,000	,,	,,	—	33/2	Do. 5 p.c. Red. Deb.	95—98	+2	..
100,000	10	Nov. 24	8	6	Cape Town, Ltd.	8—9	..	..
100,000	10	Apl. 26	4½	4½	Do. 4½ p.c. Pref.	6½—7½	..	..
150,000	Stk.	Dec. 22	4½	4½	Do. 4½ p.c. Deb.	72—77	..	..
626,860	,,	Feb. 23	6	6	Cardiff Con. Ord.	98—101	..	..
237,860	,,	Jan. 12	7½	7½	Do. 7½ p.c. Red. Deb.	101—104	..	..
187,180	,,	Feb. 23	5	5½	Chester 5 p.c. Ord.	87—93b	..	..
79,185	1	Apl. 26	†2/-	†2/-	Colombo Ltd. Ord.	31/—33/-	..	31/6—32/-
34,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	20/9—21/3
575,402	1	Apl. 12	1/03	1/03	Colonial Gas Assn. Ld. Ord.	23/—25/-	..	24/3
187,848	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	20/—22/-	..	21/6
5,073,280	Stk.	Feb. 23	5	7	Commercial Ord.	98—101	..	99½
475,000	,,	Dec. 22	8	8	Do 8 p.c. Deb.	58—61	..	..
800,000	,,	Sept. 29	‡1	‡1	Continental Union, Ltd.	32—37	..	34
200,000	,,	Mar. 8	7	7	Do. 7 p.c. Pref.	83—93	..	..
787,560	,,	Mar. 8	6½	7	Croydon sliding scale	108—113	..	111½
403,100	,,	,,	5	5	Do. max. div.	84—87	+3	85—86½
491,270	,,	Mar. 8	7	10	Derby Con.	110—115e	..	..
55,000	,,	Dec. 22	4	4	Do. Deb.	71—78e	..	..
209,000	,,	Mar. 8	5	5	East Hull Ord. 5 p.c.	76—79	..	..
50,000	,,	Dec. 22	5	5	Eastbourne 5 p.c. Deb.	93—98	+3	..
1,002,180	10	Mar. 22	†4	†6	European, Ltd.	8—9	..	..
18,708,480	Stk.	Feb. 9	5	5/1/4	Gas Light & Coke 4 p.c. Ord.	19/—19/6f	+·/3	19/—19/4½
2,660,000	,,	,,	3½	3½	Do. 3½ p.c. max.	63—65	..	64
4,187,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	77—80	..	78½—79½
5,602,620	,,	Dec. 22	3	3	Do. 3 p.c. Con. Deb.	60—62	..	61—61½
181,315	,,	,,	6	6	Do. 6 p.c. Br'tf'd Rd. Db.	102—105	..	104
1,842,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	99—101	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Mar. 8	6½	6½	Hastings & St L. 5 p.c. Conv	87—90	..	..
358,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	68—71	..	..
70,000	10	Apl. 26	†10	†10	Hongkong & China, Ltd.	13½—14½	..	..
173,200	Stk.	Mar. 8	5	5	Hornsey Con. 3½ p.c.	78—81	..	..
1,976,000	,,	Nov. 10	10	10	Imperial Continental Cap.	174—179	+2	174—178
223,130	,,	Feb. 9	3½	3½	Do. 3½ p.c. Red. Deb.	68—70	..	..
235,242	,,	Mar. 8	7	7	Lea Bridge 5 p.c. Ord.	94—97	..	97—98
3,145,907	,,	Feb. 23	5½	5½	Liverpool 5 p.c. Ord.	83½—89½b	..	..
600,000	,,	Mar. 22	7	7	Do. 7 p.c. Red. Pref.	101½—103½b	..	..
165,786	,,	Feb. 23	9	8	Maidstone 5 p.c. Cap.	109—112	..	..
75,000	5	Dec. 22	†7	†8	Malta & Mediterranean	5½—6	..	..
241,920	Stk.	Nov. 24	†7	†5	Montevideo, Ltd.	93—95	+½	93½—94½
2,061,315	,,	Mar. 8	5	5	Newcastle & Gateshead Con.	16/9—17/3d/	..	..
360,229	,,	,,	4	4	Do. 4 p.c. Pref.	70½—71½d	..	..
691,705	,,	June 29	3½	3½	Do. 3½ p.c. Deb.	66½—67½d	..	..
131,780	,,	Mar. 8	6/18/0	6/18/0	North Middlesex 6 p.c. Con.	97—100	..	98½—99½
300,000	,,	Apl. 26	9	7	Oriental, Ltd.	113—118	..	..
188,120	,,	Dec. 22	7½	7½	Plym'th & Ston'house 5 p.c.	102—107	..	..
414,500	,,	Feb. 23	7½	7½	Portsm'thCon.Stk.4p.c.Std.	101—104	..	..
236,732	,,	,,	5	5	Do. 5 p.c. max.	77—80	..	..
2,334,464	1	—	—	—	Primitiva Ord.	25/6—26/6	+·/6	24/6—26/4½
244,500	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	92—95	..	..
695,000	Stk.	Jan. 26	4	4	Do. 4 p.c. Red. Deb. 1911	76—78	..	..
416,345	,,	Dec. 22	4	4	Do. 4 p.c. Cons. Deb.	75—77	..	..
150,000	10	Mar. 22	6	6	San Paulo 6 p.c. Pref.	8½—8¾	..	..
125,000	50	Jan. 3	5	5	Do. 5 p.c. Red. Deb.	46—48	..	..
270,000	Stk.	Mar. 22	6	6	Sheffield A	100—102e	..	..
419,968	,,	,,	6	6	Do. B	100—102e	..	..
1,047,000	,,	,,	6	6	Do. C	100—102e	..	..
90,000	10	May 26	4	6	South African	4—6	..	5—5½
6,809,895	Stk.	Feb. 23	5	7½	South Met. Ord.	105—107	..	105½—106½
500,000	,,	,,	—	6	Do. 6 p.c. Irred. Pf.	110—113	+1	..
1,895,445	,,	Jan. 12	3	3	Do. 3 p.c. Deb.	59—62	..	..
734,000	,,	Mar. 8	6½	6½	Do. 6½ p.c. Red. Db.	100—102	..	101½—102
91,500	,,	Feb. 23	8½	8½	South Shields Con.	111½—112½d	—1	..
1,343,795	,,	Feb. 23	6½	6½	South Suburban Ord. 5 p.c.	105—108	..	..
368,837	,,	Dec. 22	5	5	Do. 5 p.c. Deb.	95—98	..	..
647,740	,,	Mar. 22	5	5	South'mpton Ord. 5 p.c.max.	78—80	..	78½—79½
191,276	,,	Dec. 22	4	4	Do. 4 p.c. Deb.	73—76	+1	..
250,000	,,	Mar. 8	7	7	Swansea 7 p.c. Red. Pref.	100—103	..	..
300,000	,,	Dec. 22	6½	6½	Do. 6½ p.c. Red. Deb.	99—102	..	..
120,000	,,	Feb. 23	7½	7½	Tottenham District A 5 p.c.	115—120	..	..
882,275	,,	,,	6½	6½	Do. B 3½ p.c.	93—96	+1	..
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	98—101	..	..
191,256	,,	Dec. 8	4	4	Do. 4 p.c. Deb.	75—78	+1	..
239,094	,,	Mar. 8	6½	6.5/8	Uxbridge, Maidenhead, & Wycombe 5 p.c.	90—95	..	..
88,839	,,	,,	5	5	Do. 5 p.c. pref.	86—90	..	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	,,	Mar. 8	8½	8½	Wandsworth A 5 p.c.	129—134	..	..
255,698	,,	,,	7	7	Do. B 5½ p.c.	111—116	..	..
432,595	,,	,,	5/19/0	5/19/0	Do. C and New	98—103	..	..
353,000	,,	,,	6½	6½	Do. Wimbledon 5 p.c.	106—111	..	..
98,000	,,	,,	7½	7½	Do. Epsom 5 p.c.	112—117	..	..
200,000	,,	,,	5	5	Do. 5 p.c. Pref.	86—91	..	..
88,425	,,	Dec. 22	3	3	Do. 3 p.c. Deb.	57—60	..	..
284,742	,,	,,	4	4	Do. 4 p.c. Deb.	76—79	..	..

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle. e.—Sheffield. f.—The quotation is per £1 of Stock. * Ex. div. † Paid free of income-tax. ‡ For year.

Developments at Hinckley.—At a recent meeting of the Hinckley Urban District Council, the Gas Manager, Mr. F. Lee, was instructed to obtain tenders for the new main to Earl Shilton, and prices for a new governor house at Earl Shilton. It was also stated that a letter had been received from the Minister of Health enclosing sanction for the loan of £17,615, and £5800 in respect of the new works at Hinckley.

Lighting at Deal.—At a meeting of the Deal Town Council on May 14, the question of whether gas or electricity should be adopted for an improved scheme of lighting on the sea front was discussed. The Lighting Committee recommended the acceptance of the Deal and Walmer Gas Company's tender for a three years' period from June 1 next; but after discussion it was agreed that the Council should enter into a contract for one year only.

Congleton Does Well in 1927.—Presiding at a meeting of the Congleton Gas Committee, the Chairman (Alderman A. J. Solly) said the work of the gas undertaking during the year had been very satisfactory, the profit being £4500. The Committee decided to reduce the price of gas from 3s. 6d. to 3s. 3d. per 1000 c.ft. to ordinary consumers, and from 2s. 6d. to 2s. 3d. per 1000 c.ft. for power and industrial purposes, the reductions to date from April 1.

Extensions to Plant at Bingley.—The Bingley Urban District Council are considering a scheme for new carbonizing plant, and possibly also a new gasholder. The need for renewals and improvements is admitted, but there is dispute as to the extent of expenditure to which the Council should be committed. A £100,000 scheme for entire new plant was rejected some months ago, and a smaller scheme of extensions of the present works, to cost about £60,000, was deferred. Mr. J. B. Balmforth, the Gas Engineer and Manager, was asked to submit a still more modest scheme; and this, providing for new carbonizing plant and perhaps also a new holder, is to be considered. The storage capacity is said to be inadequate for modern requirements. The undertaking had had a very successful financial year, and the Gas Committee recommend the reduction of the charge for gas from 3s. 6d. to 3s. 4d. per 1000 c.ft., to date from July 1.

Southgate Rotarians and Underground London.—Captain W. J. Liberty, at the invitation of Mr. S. B. Chandler, Distributing Engineer to the Tottenham District Light, Heat, and Power Company, and Chairman of the Speakers Committee of the Southgate Rotary Club, gave the luncheon hour talk on Monday, May 21, on "Some Phases of Underground London." He mentioned the statement by Mr. Stephen Lacey that "everyone spontaneously associates transport above ground with public highways, but, because 'out of sight, out of mind,' few think of the transit below ground. The unseen transport, which goes on unceasingly, is none the less essential to civilization. What, for example, would a house be worth cut off from connection with water and gas mains, the drainage system, electric and telephone cables? Such a house would be a derelict. The weight of gas distributed by the Metropolitan Gas Companies through the underground systems is about 1 million tons per annum. By far the greater part is used for heating and cooking, and is consumed in appliances which displaced those using raw coal. Were it possible to revert to the use of coal for these purposes, at least four million tons per annum would be required; and the whole, together with ashes therefrom, would have to be carried by road."

The Llanrwst Urban Council have decided to adhere to the present system of lighting the town by gas.

The Nantwich Urban Council have in hand a scheme to purchase the Nantwich Town Hall, for converting into offices in connection with the gas-works, which is publicly owned.

The Enniskillen Gas Company are making an application to the Northern Ministry of Commerce for an Order to have the price of gas in the town increased from 8s. 8d. to 9s. per 1000 c.ft.

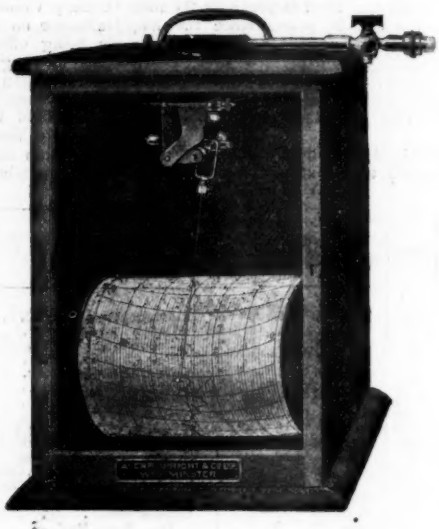
It has been reported to the Oldbury District Council that the Ministry of Health has sanctioned the borrowing of sums totalling £12,000 for capital expenditure in connection with the gas undertaking.

At a meeting of the Directors of the Croydon Gas Company held on the 11th inst., it was decided to send on behalf of the Company the sum of one hundred guineas to the Lord Mayor of London, as a donation to his fund for the relief of distress in the coalfields.

The firm of R. & G. Hislop, Gas and Heating Engineers, Underwood House, Paisley, of which Robert Findlay Hislop and George R. Hislop were the sole partners, has been dissolved by mutual consent, as at Dec. 31, 1927. The business will be carried on by Mr. George R. Hislop under the same firm name.

The Halifax Corporation Gas Committee, having found it desirable to dispense with the services of half the town's lamplighters during the summer months, owing to lighting curtailment, offered to distribute the reduced work over the whole of the men, rather than throw any men out of employment. The lamplighters not affected by the prospective dismissals objected; but there has now been a consultation between the Gas Committee and the General Workers' Union, with the result that the Committee's scheme of part employment of the whole of the men has been accepted.

A party representing the West Riding Regional Committee on Smoke Abatement on May 11 visited the plant of Low-Temperature Carbonisation, Ltd., at Barugh. At Barnsley, subsequently, the visitors saw the smokeless fuel in use for heating and cooking in miners' homes. After tea, Mr. R. P. Wilson, offering a welcome on behalf of the Company, said that during the past few days work had been started on the new "Coalite" plant at the Askern Collieries. Within a comparatively short time the output of "Coalite" would be more than doubled; and if municipalities and gas undertakings followed the example set by Yorkshire, it would not be long before there was a chain of smokeless fuel plants from one end of the country to the other.



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